

HEALTH MANPOWER PLANNING, PRODUCTION AND MANAGEMENT

**Report
of
Expert Committee**

MINISTRY OF HEALTH & FAMILY WELFARE
GOVERNMENT OF INDIA NEW DELHI

1987

HEALTH MANPOWER, PLANNING, PRODUCTION AND MANAGEMENT

Report of Expert Committee

CONTENTS

	PAGE
I. Introduction	1
II. Health and Education : An Interface for human resources development situation analysis	3
III. Health manpower needs and resources	11
IV. Health manpower production for primary and intermediate health care- .	19
V. Health manpower management	28
VI. Mechanisms for implementation	32
VII. Recommendations	37
VIII. Annexures	
1. Resolutions	45
2. Composition of Expert Committee	49
3. Health manpower requirement projections	50
4. Reports of previous committees and publications consulted	52
5. Report of visit of Sub-committee to Karnataka, Tamil Nadu and Andhra Pradesh	53
6. Suggestions received from	55
7. Manpower requirement for hospital nursing services	56
8. Indian system of medicine and Homoeopathy.....	57
9. Coverage of adult education programme in India.....	58
10. Coverage of non-formal adult education programme	59
11. Institutions conducting vocational courses	60
12. Vocational courses, syllabi, job descriptions.....	61

PREFACE

There has been a dichotomous growth of health services and manpower, each developing in isolation and without proper linkages in temporal and spatial dimensions. Historically, there has been a major, although misplaced, emphasis on the development of physical, technical and technological facilities, rather than on health manpower development. The resultant distortions have particularly affected the planning, production and management of allied health professionals.

The National Policy on Education, 1986, for the first time took cognisance of the essential linkages between health and education and clearly stated, 'Health planning and health service management should optimally interlock with the education and training of appropriate categories of health manpower through health-related vocational courses. Health education at the primary and middle levels will ensure the commitment of the individual to family and community health, and lead to health-related vocational courses at the-f-2 stage of higher secondary education'. Immediately following the adoption of the policy, the Ministry of Health and Family Welfare constituted the Expert Committee for Health Manpower Planning, Production and Management. In September, 1986 the Committee submitted its interim report which was considered and approved in the Joint Conference of Central Councils of Health and Family Welfare held on September 22-24, 1986.

The members of the Expert Committee on Health Manpower have been drawn from several sectors including health and medical education, para-professional education, general education, education planning and administration, and employment and labour. This has provided intrinsic strength to the deliberations of the Committee which reflect a holistic approach to education and health, thus fulfilling to a large measure the objectives laid in the National Policy on Education.

A perusal of the report would make it abundantly clear that several measures need to be initiated concurrently, both in the field of health as well as in that of education, so as to enable the country to achieve the twin objectives of health for all, and universalisation of primary education, by the year 2000 AD. Of immediate relevance and significance is the need to enunciate National Policy on Education in Health Sciences, with clear perspectives and well formulated strategies for the future growth and development of health manpower in the country.

The Committee is convinced that such measures as recommended can be expeditiously implemented at the present time when the leadership of the Ministry of Health as well as of Human Resources Development is vested in Shri P. V. Narasimha Rao. We, therefore, trust that the Government would give a most urgent and serious consideration to these recommendations, and take appropriate decisions so as to provide desired orientation in the education system, both in the areas of vocationalisation of general education, and education in health sciences.



GOVERNMENT OF INDIA
MINISTRY OF HEALTH & FAMILY WELFARE
NIRMAN BHAVAN, NEW DELHI-110 011

JUNE, 1996

Our thanks are also due to the eminent administrators and scientists (names given in Annexures 2, 5 & 6) who favoured the Committee with their views.

JANUARY, 1987

NEW DELHI.

PROF. J. S. BAJAJ

Chairman

CHAPTER I

INTRODUCTION

1.1 Constitution of the Committee

The Ministry of Health and Family Welfare, Government of India, set up an Expert Review Committee for Health Manpower Planning and Development with major emphasis on the creation of additional facilities for vocational training vide Resolution No. U. 11020/2/86-MEP dated the 8th May 1986* and subsequently dt. 29-5-86, 1-8-86 & 5-9-86 with the following composition :

1. Prof. J.S. Bajaj, Professor of Medicine, AHMS, New Delhi. *Chairman*
2. Dr. Harcharan Singh, Joint Advisor (Health), Planning Commission. *Member*
3. Shri. Satyan Bhushan, Director, National Institute of Educational Planning & Administration or his nominee. *Member*
4. Shri A.M. Nimbalkar, Director-General of Employment & Training/Joint Secretary, Ministry of Labour (or his nominee). *Member*
5. Dr. J.P. Gupta, Joint Director, National Institute of Health & Family Welfare. *Member*
6. Mrs. P.K. Karthiyani, D-2, Kaveri Apartments, Alkananda Colony, New Delhi. *Member*
7. Shri S. K. Handa, Dy. Educational Advisor (H), Ministry of Human Resources Development. *Member*
8. Dr. K.B. Sharma, Deputy Director-General of Health Services, New Delhi. *Member-Secy.*

1.2 I. The terms of reference of the Committee are as follows :

1. To provide an assessment of existing and projected national health manpower requirements for the primary and intermediate level health care programmes, and to recommend the establishment of mechanism(s) through which such projections could be continuously reviewed in the context of evolving socio-epidemiological needs and demographic requirements.
2. To recommend the type of health-related courses of instruction that should be incorporated at the +2 stage for vocational education and to recommend appropriate educational content at the pre-vocational level which would stimulate

and encourage the students to enter health related vocational courses,

3. To recommend the essential educational infrastructure including establishment of educational institutions and facilities or strengthening of such facilities in already existing educational institutions that would facilitate the production of appropriate categories of health manpower.
4. To recommend such modifications in the education and health systems that would facilitate the establishment of essential interlinkages between health manpower production, deployment and utilisation.
5. To make recommendations that would safeguard the career prospects of various categories of health manpower at the primary and intermediate level, through the development of bridge courses for horizontal mobility and vertical progress.
6. To recommend the establishment of mechanisms or agencies so as to ensure an expeditious development of educational objectives, curricular contents and learning settings for the course of instruction recommended by the Committee.

II. The Committee will also take into consideration the reports of the Expert Committees already available on manpower projection and the present supply of vocational, technical and professional manpower in the medical and allied health related areas.

III. The Committee may also consider and make its recommendations in regard to any other related matter.

1.3 The Committee commenced its work on the 20th May, 1986 when it had its first meeting. The Committee met on 20-5-86, 20-6-86, 9-8-86, 17-9-86, 2-10-86, 13-10-86, 27-10-86, 8-12-86 and 17-12-86.

1.3.1 In the meeting held on 20-5-86, Shri S. C. Basu and Shri S. K. Giri attended as nominees of Shri A. M. Nimbalkar, Director-General of Employment and Training, Ministry of Labour. Shri K. C. Saxena attended the subsequent meetings as the nominee of the Director-General of Employment and Training.

1.4 At its first meeting, the Committee decided to elicit the opinion of all the Principals and Deans of Medical Colleges as well as Directors of Health Services in the States, other eminent medical people representing professional organisations/bodies, requesting them to submit such Memoranda relevant to the terms of reference of the Committee, that would facilitate the work of the Committee. The Committee also constituted two Working Groups for the preparation of appropriate background documents and suitable recommendations. Working Group I consisting of Dr. K. B. Sharma and Dr. J. P. Gupta were assigned the preparation of appropriate material related to the terms of reference No 1 and 6. Working Group II consisting of Dr. Harcharan Singh, Prof. Satya Bhushan and Prof. J. S. Bajaj were assigned the task of preparing background documents with recommendations related to the terms of reference No. 2, 3 and 4. Mrs. P. K. Karthiyani was requested to prepare a note on Nursing Education. She subsequently joined Working Group I as a member.

1.5 At its Second meeting, the Committee decided to invite the representatives of the organised sectors including Defence, Railways, Post and Telegraph, and EST to submit norms for health manpower planning as being used in their respective organisations for the delivery of health services along with the present number of different categories of health manpower in service, and projections for the future health manpower planning.

1.6 It was also decided to have special invitees who were actively involved in the development of educational programmes for vocationalisation of 4-2 stage of general education. Other special invitees representing professional bodies as well as professional councils representing medical education and other health-related areas were also consulted.

1.7 In view of the availability of a number of report on medical education at the undergraduate and the postgraduate level, it was decided that only relevant references to medical education at various levels are made in the report, with particular emphasis on the interaction of medical and allied health professionals at different levels as member of the health care delivery team. The major focus in the report, as envisaged under the terms of reference, is on the planning, production and management of allied health professionals essentially needed at primary and intermediate health care levels.

1.8 In the third meeting, it was decided that an interim report be submitted with major focus

on the following terms of reference :

1. To recommend the type of health related courses of instruction that should be incorporated at the +2 stage for vocational content at the pre-vocational level which would stimulate and encourage the students to enter health-related vocational courses.
2. To recommend the essential educational infrastructure including establishment of educational institutions and facilities or strengthening of such facilities in already existing educational institutions that would facilitate the production of appropriate categories of health manpower.

1.9 The interim report was considered in the meeting of the Committee on 9-8-86 and was submitted with the unanimous endorsement of all the members.

1.10 The interim report was presented at the 12th Central Council of Health, held on 22-24th September 1986. The report was approved at this meeting.

1.11 In the meeting held on 17-9-86, the Committee held discussions with the representative of the Nursing Council of India. In the meetings held on 2-10-86 and 13-10-86, discussions were held with the representatives of Dental Council and Pharmacy Council of India. It was also decided that a sub-committee should visit the States of Karnataka, Andhra Pradesh and Tamil Nadu where vocationalisation of health related courses is being carried out.

1.12 A sub-committee consisting of Prof. J. S. Bajaj, Prof. Harcharan Singh, Prof. Satya Bhushan, Prof. A. K. Mishra and Prof. K. B. Sharma visited the States of Karnataka, Andhra Pradesh and Tamil Nadu on 22-25th October 1986 to have a first hand knowledge of the vocational health related courses being conducted in these States. The Committee met the health and education authorities in these States and visited several schools/institutions where these courses are held, to obtain first hand knowledge of the facilities available, the conduct of courses, acceptability by the students and employment potentials. The Committee also met the students, teachers of vocational and general courses and ascertained their views also. The report of the visit is given in Annexure 5.

1.13 The draft report was presented in the meetings on 8-12-86 and was finalised in the meeting on 17-12-86. The Report is being submitted with the unanimous endorsement of all the members.

CHAPTER II

HEALTH AND EDUCATION : AN INTERFACE FOR HUMAN RESOURCES DEVELOPMENT

SITUATION ANALYSIS

2.1 Health development is a continuous and dynamic process. From time to time, strategies for development of health services have to be reviewed,

2.1.1 *Bhore Committee* (1946).—One of the most outstanding efforts in health services planning in this country has been the Health Survey and Development Committee (1943-1946), popularly known as Bhore Committee.

2.1.1.1 The basic principles underlying recommendations of the committee were:

- (i) No individual should fail to secure adequate medical care because of inability to pay for it;
- (ii) Health service should provide all consultant, laboratory and institutional facilities for proper diagnosis and treatment;
- (iii) The health programme must from the very beginning lay special emphasis on preventive work.
- (iv) Health services should be placed as close as possible to the people in order to ensure the minutes to be served;
- (V) Health consciousness should be stimulated by providing health education on a wide basis as well as by providing opportunities for the individual participation in local health programmes, and
- (vi) Medical service should be free to all without distinction.

2.1.1.2 These principles have, by and large, stood the test of time in our planning efforts through the instrument of Five Year Plans and have also provided basis for functioning of various Committees appointed from time to time.

2.1.1. Apart from these factors, another significant development which changed the complexion of the health services delivery system in post-independent India, has been the Community Development Blocks—a novel experiment in inter-sectoral coordination. Recently, however, the most notable developments which have tremendous implications for not only all the health services development but the entire field of human resource development have been the Alma Ata Declaration and Asian Charter of

Health Development, of which India is signatory, the National Health Policy which has adopted the goals of Health For All through primary health care, and Net Reproduction Rate of Unity by 2000 A.D., and the National Education Policy, with the goals of eradication of illiteracy and universalisation of Education by 2000 A.D.

The basis framework of health services infrastructure, with minor variations, has remained the same as was recommended by the Bhore Committee and which came into being between, 1947 and 1952. This framework consisted sub-centres, primary health centres and district organisation.

2.1.1.4 It is also interesting to know that the role of community participation which is now-considered as the pivot for health services development, was also conceived by the Bhore Committee.

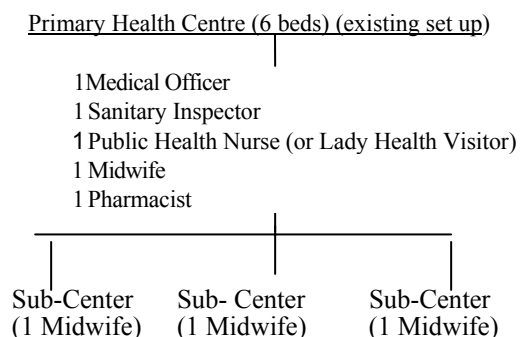
Health consciousness should be stimulated by providing health education on a wide basis as well as by providing opportunities for the individual participation in local health programmes

"A Health Committee of 5-7 individuals in every village would stimulate local efforts for the improvement of environmental sanitation and control of infections. The committee considered that the development of local efforts and promotion of a spirit of self-help in the community are as important to the success of the health programme as the specific services which the health officers will be able to place at the disposal of the people".

2.1.1.5 In any given situation the categories of health manpower required to deal with health of the community will be guided largely by the morbidity and mortality pattern and the factors responsible either causative or contributory to such morbidity and mortality patterns.

2.1.1.6 With regard to the role of Indian System of Medicine (ISM), the Bhore Committee realised the wide acceptance of the ISM by a large section of the population of India and the part that these systems had played in the past in influencing the development of medicine in other countries of the world.

2.1.1.7 The development of primary health centre complex proceeded along the recommendations of Shore Committee and it became an integral part of community development blocks with the launching of this movement in 1952. The primary health centre set up established as a result of the abovementioned development at the time of constitution of Health Survey and Planning Committee (Mudaliar Committee)-1961 is given below:



2.1.2.1. *Mudaliar Committee* (1961).—As a result of launching of several national health programmes mostly of a vertical nature around late 50's and early 60's, the complexion of primary health centre and its constituent units in so far as the entire health manpower in a block was concerned, has been undergoing changes. The Health Survey and Planning Committee *popularly known as Mudaliar Committee* (1961), was constituted with following terms of reference:

1. The assessment (or evaluation) in the field of medical relief and public health since the submission of the Health Survey and Development Committees' report (the Bhore Committee);
2. Review of the first and second Five Year Plan Health projects; and
3. Formulation of recommendations for the future plan of health development in the country.

The Committee recommended consolidation of the then existing structure and opening of the new primary health centres on the pattern recommended by Bhore Committee for a population of 40,000 as given below:

Medical Officers	2
Public Health Nurses	4
Nurse	1
Midwives	4
Trained Dais	4
Public Health Inspectors'	2
Health Assistants	2
Pharmacist	1
Clerks	2
Fitter Mistry	1
Inferior servants	15

2.1.2.2 As stated earlier while the basic infrastructure of health services consisting of sub-centres, primary health centres, district health organization etc. have remained the same over the years, the structure on health manpower manning these complexes has been undergoing a change from time to time. Although the major emphasis remained around the doctors and the concern has been with the undergraduate and postgraduate medical education, nevertheless certain developments in terms of enhancing the training of allied health personnel consisting of nurses, health visitors, ANMs, Dais, laboratory assistants, refractionists, opticians, auxiliary health workers or health assistants, pharmacists and public health engineering personnel had taken place.

2.1.2.3 The deliberations of Mudaliar Committee in so far as the health manpower is concerned were again heavily weighted in favour of undergraduate and postgraduate medical education. However, it made a slight departure from the past as can be seen from the following extracts :

The expression 'professional education' as applied to medicine and public health may be broadly defined as education comprising those courses of training which are necessary for the proper preservation of the health of the nation. It will thus include the training of doctors, dentists, pharmacists and pharmacologists, public health personnel, nurses and midwives, and several varieties of paramedical personnel so essential for the proper coordination of all aspects of medical and public health care. The paramedical personnel will include auxiliary medical and public health personnel like public health engineers, laboratory technicians, radiographers, dieticians, dental auxiliaries, vaccinators, malariologists etc.

2.1.2.4. On the issue of *manpower requirements*, the gist of the Mudaliar Committee recommendations is as follows :

- (i) that if recommendations for the use of auxiliary and paramedical personnel are accepted and more of these persons are trained, the services of the doctor would be better utilised for those duties which really fall on a trained medical person.
- (ii) the numbers of doctors, nurses, dentists, pharmacologists and public health engineers along with paramedical personnel are at present not adequate to meet the requirements of the country.
- (iii) for manning the training institutions, there has been a deficiency of trained personnel which has to be made good as soon as possible.

(iv) the institution of a Master of Science degree which will be available for graduates in science who have taken up Mathematics, Physics, Chemistry, Botany or Zoology is rewarded. There is a wide field for useful employment of such graduates and post-graduates both in the public health department and in many institutions for medical relief.

(v) it is very essential that a large number of technicians should be trained for multipurpose duties in the field of medicine. It is felt that all district headquarters hospitals and all the large hospitals with a bed strength of 200 can train these technicians, the period of training may vary from 1 year to 2 years and persons to be taken on for training must be those who have completed their school final or equivalent course.

2.1.2.5 With regard to the training of para-medical and other personnel, it observed the following:

"So far as nurses are concerned, there should be three grades of nurses :

- 1) the basic nurse with 4 years training including six months in midwifery and six months in Public Health,
- 2) the auxiliary-nurse midwife having two years' training; and
- 3) the nurse with a degree.

At the same time, facilities should be available for the basic nurse to be able, under specified conditions, to get higher qualifications. Similarly, the auxiliary-nurse-midwife may be given opportunities under specified conditions to work for the basic course of nursing after putting in 3 years' work."

2.1.2.6 "Besides medical and nursing personnel, there is an urgent need for different types of medical auxiliaries to help doctors and public health workers in various fields. Among the groups that may be mentioned under the medical auxiliaries are chiropodists, dieticians laboratory technicians, occupational therapists, physiotherapists, radiographers, remedial gymnasts, almoners, dental hygienists, and dental mechanics."

2.1.2.7 "With regard to the Indian System of Medicine (ISM), the following observations of Mudaliar Committee may be noted :

"Linkage between practitioners of ayurveda and the modern system of medicine may be tried, by offering to practitioners of ayurveda a specific course of training for 2-3 years covering preventive medicine, obstetrics and gynaecology and principle of surgery so that after training

their services can be utilised for health care. Such training will not, however, entitle them to a degree in modern medicine. It also recommended that postgraduate training in ayurveda should be available to medical graduates following the conferment of the degree of M.B.B.S."

2.1.3 *Chadha Committee* (1953).—In the late 50's and early 60's, the Government of India was, therefore, seized with the problem of integrating the maintenance phase of the malaria eradication programme with the general health services in the country consisting of sub-centres, primary health centres, and district level organizations. It, therefore, appointed a Committee known as Special Committee on the Preparation of Entry of the NMEP into maintenance phase, popularly known as Chadha Committee, which gave its recommendations in 1963.

2.1.3.1 The Chadha Committee recommended that the then existing malaria surveillance worker may be changed into auxiliary health workers/basic health workers, one per 10,000 population, supported and supervised by sanitary inspectors/health inspectors at the rate of one per 20-25,000 population for which an additional post of health inspector was to be created in each of the blocks.

2.1.3.2 It recommended creation of the post of laboratory technicians at the PHC, and a post of a family planning field worker (FPFW)/ health assistant at the rate of one per 30,000 population to take care of the emerging problem of population growth and, therefore, intensifying family planning measures.

2.1.3.3 It recommended that the services of the extension educator should be utilised for all the national health programmes.

2.1.4. *Mukherjee Committee* (1966).—Mukherjee Committee was appointed by the Government of India to review what additions and changes are necessary as a result of the greatly altered situation due to the IUCD having come in the forefront of the family planning programme, in the staffing pattern, financial provisions etc. The recommendations of the Committee were:

2.1.4.1 There should be one FPFW for every two sub-centres.

2.1.4.2 that an extra post of LHV should be created so that one LHV is available for 40,000 population.

2.1.4.3 that part-time workers for motivating population for acceptance of IUD should be appointed with honorarium.

2.1.4.4 that at the block and district levels, education leaders be appointed for intensifying motivational campaign and be paid honorarium of Rs. 600 per annum.

2.1.4.5 that the government doctors may be provided incentives which should also be available to part-time private medical practitioners in terms of honorarium of Rs. 100 p.m.

2.1.5 *Kartar Singh Committee* (1974).—As a result of launching of several national health programmes, there occurred tremendous variations in the categories of manpower requirements which posed problems in terms of providing integrated services. This feasibility of integrating various categories of health manpower at the grass-root level to provide integrated services having become available, the government of India had appointed in 1972 a Committee popularly known as Kartar Singh Committee with the following terms of reference:

- 1) the structure for integrated services at the peripheral and supervisory levels;
- 2) the feasibility of having multipurpose/bipurpose workers in the field;
- 3) the training requirements for such workers; and
- 4) the utilisation of mobile service units set up under family Planning Programme for integrated medical, public health and family planning services operating from Tehsil/Taluq level.

2.1.5.1 The Committee observed that National Programmes in the field of health family planning and nutrition had been running almost independently of each other by staff recruited under each programme. There was little or no coordination between the field workers of these programmes and even at the supervisory level there were separate and independent functionaries. It had also yielded some results notably in malaria and smallpox. However, the major issue was whether the objective could be better achieved by coordinating the programmes and pooling the personnel.

The Committee recommended that the concept of change of unipurpose to multipurpose workers was both feasible and desirable.

2.1.5.2. The recommendations of this Committee visualised a team of male and female workers at grass-root level serving a population of 3000-3500 within a distance of not more than 5 kms.

2.1.5.3. Under the scheme there would be one female supervisor for 4 ANMs and one male supervisor over 3-4 male health workers. This would mean creation of additional post of a Lady Health Visitor and clubbing of the posts of Health Inspectors, Sub-Inspectors, Malaria Surveillance Inspectors and Vaccinators, Supervisors together to make them into male supervisors.

2.1.5.4 This scheme, after studying its feasibility, was launched on a nation wide scale in the four year plan.

2.1.6 *Shrivastav Committee* (1975).—The issue of developing alternative strategies for the delivery of health services and rationalisation of the health manpower both in terms of number of personnel as well as categories of personnel has been engaging the attention of the Govt. of India from time to time. Accordingly, a Group on Medical education and support Manpower under the chairmanship of Dr. J. B. Shrivastav was established to focus on this issue, with the following terms of reference :

- 1) to devise a suitable curriculum for training a cadre of Health Assistants conversant with basic medical aid, preventive and nutritional services, family welfare, maternity and child welfare activities so that they can serve as a link between the qualified medical practitioners and the Multi-purpose Workers, thus forming an effective team to deliver health care, family welfare and nutritional services to the people;
- 2) keeping in view the recommendations made by the earlier Committees on Medical Education, specially the Medical Education Committee (1968) and the Medical Education Conference (1970), to suggest suitable ways and means for implementation of these recommendations, and to suggest steps for improving the existing medical educational processes so as to provide due emphasis on the problems particularly relevant to national requirements; and,
- 3) to make any other suggestions to realise the above objectives and matters incidental thereto.

The Group in its deliberations had come to a conclusion that their proposals for basic reforms in medical education and organization of support manpower should be made in the context of organization of a nation-wide network of efficient and effective health services in the country. The report submitted in 1975 highlighted the following:

2.1.6.1 Development essentially means the development of human rather than material resources.

2.1.6.2 A conscious and deliberate decision should be taken to abandon the model of western medicine and replace it by a model which will have to place a greater emphasis on human effort for which we have a large potential.

2.1.6.3 Health is essentially an individual responsibility in the sense that, if the individual cannot be trained to take proper care of his health, no community or State programme of health services can keep him healthy.

2.1.6.4 The community responsibility in health are even more important. It is the duty of the community to provide a proper environment for helping each individual to be healthy.

2.1.6.5 The group recommended a four-tier structure given below :

- (1) The members from the community chosen by the Community themselves and trained by the health departments to function as community health worker/ health guides. These workers of honorary character would bridge the gaps between the community and the organised health services at the grass-root level.
- (2) The Multipurpose Workers (Male and Female) belonging to the organised health services at grass-root level for a defined population.
- (3) The Health Assistants who would be functioning in the primary health centres.
- (4) The medical officers and other para-medicals at the level of Primary Health Centre.

The recommendations of this Committee in terms of bridging the gap between community and the organised health services in terms of creation of band of workers from within the community were put into operation on October 1977 and the scheme since then has been operating in the country in a phased manner, the name of these workers undergoing change from time to time.

2.1.7 Experiments in microplanning on the lines had, in fact, preceded the submission of Shrivastav Committee report and the launching of national plan of action in October 1977. The State of Jammu & Kashmir in 1975 had initiated Rehbar-i-Sehat programme utilising the services of primary school teachers, to strengthen health promotion and disease prevention activities, besides providing first contact health care for common ailments.

2.1.8 *Medical Education Review Committee {Mehta Committee 1983}*.—Part II of the Report of Mehta Committee specifically deals with lack of availability of health manpower data in India, recommendations regarding methods for updating such data, and manpower projections for doctors, nurses and pharmacists. Part-I of the Report deals with medical education in all its aspects, but there is a major recommendation regarding the establishment of Universities of Medical Sciences and Medical and Health Education Commission.

2.1.9 *Working Group on Medical Education, Training and Manpower Training, Planning Commission (1984)*—The Working Group on Medical Education, Training and Manpower Planning as one amongst eight Working Groups appointed by the Planning Commission for formulating the 7th Five Year Plan had brought out some basic issues such as restructuring, of organizational set up, management reforms,

decentralised planning, Bureau of Health Manpower Development, setting up of institutional objective,- post-graduate training in public/community health management, Medical Education and Rome Scheme, Institutional network through University of Health Sciences and or Health and Medical Education Commission, which have implications for health manpower development especially related to paramedical manpower.

The group had recommended that emphasis and high priority should be given to train para-professional and auxiliary personnel, so as to correct the imbalances. It also laid down priorities for training of manpower as given below :

- 1) Training and development of auxiliary personnel.
- 2) Training and development of para-professional personnel.
- 3) Basic and preservice / induction training in public health and health management.
- 4) Continuing education in health management and public health.
- 5) Undergraduate medical education, and
- 6) Postgraduate medical education.

2.2 National Health Policy

2.2.1 India is committed to attaining the goal of - Health for All by the Year 2000 AD", through the universal provision of comprehensive primary health care services. As emphasised in the Policy adopted by the nation in December 1982, the attainment of this goal requires a thorough overhaul of the existing approaches to the education and training of medical and health personnel and the reorganisation of the health services infrastructure. Furthermore, considering the large variety of inputs into health, it is necessary to secure the complete integration of all plans for health and human development with the overall national socio-economic development process specially in the more closely health-related sectors, e.g. drugs and pharmaceuticals; agriculture and food production; rural development; education and social welfare; housing, water supply and sanitation; prevention of food adulteration; maintenance of prescribed standards in the manufacture and sale of drugs, and the conservation of environment. In essence, the contours of the National Health Policy will have to be further evolved within a fully integrated planning framework which seeks to provide universal, comprehensive primary health care services, relevant to the actual needs and priorities of the community at a cost which the people can afford, ensuring that the planning and implementation of the various health programmes is through the organised involvement and active participation of the community, adequately utilising the services being rendered by private voluntary organisations active in Health / Social Sector.

2.2.2 It further states that it is also necessary to ensure that the pattern of development of the health services infrastructure in the future fully takes into account the revised 20 Point Programme. The said programme attributes very high priority to the promotion of family planning as a people's programme, on a voluntary basis; substantial augmentation and provision of primary health care facilities on a universal basis: control of leprosy, tuberculosis and blindness: acceleration of welfare programmes for women and children; nutrition programmes for pregnant mothers, nursing mothers and children especially in the tribal, hill and backward areas. The programme also places high emphasis on the supply of drinking water to all problem villages: improvement in the housing and environment of the weaker sections of society: increased production of essential food items; integrated rural development programme; spread of universal elementary education; expansion of the public distribution system, etc.

2.2.3 The Policy statement emphasises that irrespective of all the changes, no matter how fundamental, that may be brought about in the overall approach to health care and the restructuring of the health services, no much headway is likely to be achieved in improving the health status of the people unless success is achieved in securing the small family norm, through voluntary efforts, and moving towards the goal of population stabilisation. In view of the vital importance of securing the balanced growth of the population, it is necessary to enunciate, separately, a National Population Policy.

2.2.4 The National Health Policy reaffirms that it is also necessary to appreciate that the effective delivery of health care services would depend very largely on the nature of education, training and appropriate orientation towards community health of all categories of medical and health personnel and their capacity to function as an integrated team, each of its members performing given tasks within a coordinated action programme. It is, therefore, of crucial importance that the entire basis and approach towards medical and health education, at all levels, is reviewed in terms of national needs and priorities and the curricular contents remodelled, and training programmes restructured, to produce personnel of various grades of skill and competencies, who are professionally equipped and socially motivated to effectively deal with day-to-day problems, within the existing constraints.

2.2.5 Towards this end, it is necessary to formulate, separately a National Medical and Health Education Policy which (i) sets out the changes required to be brought about in the curricular contents and training programmes of medical and health personnel, at various levels of functioning, (ii) takes into account the need for establishing the extremely essential interrelations between functionaries of various grades, (iii) provides guidelines for the production of

health personnel on the basis of realistically assessed manpower requirements, (iv) seeks to resolve the existing sharp regional imbalances in their availability, and (v) attempts to ensure that personnel of all levels are socially motivated towards the rendering of community health services.

2.3 Kothari Commission for Education 1964-66

Since independence, while developments' in health sector have been gradually converging upon the necessity as well as desirability of linkages with education system, an attempt to introduce vocationalization of higher secondary education was initiated as a result of the report of Kothari Commission. It was conceived that there would be two equal streams at +2 stage each carrying around 50% of the total students. It was expected that the vocational stream over a period of time, will become a major outlet for the development of socially relevant skills, thus generating not only a pool with a higher employment potential, but also aiming to supply the manpower needed for developmental activities both in the private and public sector in the country.

2.4 National Policy on Education 1986

Taking cognisance of the fact that education in India is at the critical cross-roads where neither a normal linear expansion nor an acceleration of existing pace and nature of improvement, can lead to the realisation of the ultimate goal of rapid socio-economic development through the strengthening of human resources potential, a major effort has been undertaken to restructure National System, of Education.

2.4.1 A new National Policy on Education has, therefore, been developed and adopted by Parliament of India in May 1986. The Policy aims to view education as a dynamic process with inherent flexibility and capability enabling the future generations to internalise new ideas constantly and creatively.

2.4.2 A key emphasis in the new Policy is on the development of manpower for different levels of the economy, recognising that such a process is indeed the substrate on which research and development in all areas of scientific and technical activity should be nurtured, thus leading to the ultimate objective of national self-reliance.

2.4.3 The national system of education envisages a common 10 + 2 + 3 educational structure, with efforts to develop an elementary system comprising of five years of primary education and three years of upper primary, followed by two years of high school in the first phase of ten years of education. As a part of common key curriculum during this phase, emphasis has been placed on social and moral education. The core curriculum also refers to the protection of environment, observance of the small family norm, and inculcation of the scientific temper.

2.4.4 The Committee is of the firm view that social moral, health and physical education should constitute a holistic approach. The curricular contents of courses of instruction for school teachers, and more particularly physical education instructors, should include these components so that the rationale of such an approach is imbibed during the period of train-ins. Curricular reforms on the lines indicated were initiated in the State of Jammu & Kashmir and linked with the community oriented primary health care system through the Rehbar-i-Sehat programme.

2.4.5 Eradication of illiteracy and universal education are the two most important enabling objectives enunciated in N.P.E. Besides elementary school education already referred to, adult education and non-formal education constitute the major intervention strategy. While adult education focuses at the age group 15-35 years, non-formal education aims at development of learning programmes for school drop-outs, for children of habitations without schools, working children and girls who cannot attend whole day schools.

2.4.6 The introduction of systematic, well-planned and rigorously implemented programmes of vocational education has been recognised as crucial in the proposed reorganisation. The key elements in vocational education are meant to enhance individual employability, to reduce the mis-match between the demand and supply of skilled manpower, and to provide an alternative for those pursuing higher education without particular interest or purpose.

2.4.7 Although the vocational courses will ordinarily be provided at the +2 stage of the 10 + 2 system, the scheme has been kept flexible so as to make available some of these courses after Class VIII. Furthermore, non-formal, flexible and need-based vocational programme will also be made available to neo-literates, youths who have completed primary education, school dropouts, persons engaged in work and unemployed or partially employed persons. It is envisaged to give special attention in this regard to women.

2.4.8 It is proposed in the New Education Policy that vocational courses cover 10 per cent of higher secondary students by 1990 and 25 per cent by 1995. Steps will be taken to see that a substantial majority of the products of vocational courses offered would be regularly undertaken. Government will also review its recruitment policy to encourage diversification at the secondary level.

2.4.9 Work experience, viewed as purposive and meaningful manual work, organised as an integral part of the learning process and resulting in either goods or services which are useful to the community, is considered as an essential

Component at all stages of education[^] to be provided through well-structured and graded programmes. Such an experience as a part of pre-vocational programmes, and provided at the upper primary and lower secondary stages, is likely to facilitate the choice of the vocational course at the secondary stage.

2.5 Intel-linkages between Health and Education Policies:

2.5.1 There are several interlinking areas between National Health Policy and National Policy on Education, amply reflecting the interdependence of literacy and health. For the purpose of this report, the following excerpts from the National Policy on Education need reiteration :

"Health planning and health service management should optimally interlock with the education and training of appropriate categories of health manpower through health-related vocational courses. Health education at the primary and middle levels will ensure the commitment of the individual to family and community health, and lead to health-related vocational courses at the +2 stage of higher secondary education."

"Graduates of vocational courses will be given opportunities, under predetermined conditions, for professional growth, career improvement and lateral entry into courses of general technical and professional education through appropriate bridge courses."

2.5.2 A similar awareness of the role and place of public health education as a motivational force for the development of an attitude of healthy living, is demonstrated in the National Health Policy which states :

"The public health education programmes should be supplemented by health, nutrition and population education programmes in all educational institutions, at various levels. Simultaneously, efforts would require to be made to promote universal education, specially adult and family education, without which the various efforts to organise preventive and promotive health activities, family planning and improved maternal and child health cannot bear fruit."

2.5.3 The Expert Committee is of the considered view that implementation strategies aimed at intersectoral coordination between education and health have been conspicuously lacking in the past, and that the stated goals and objectives have not been translated into concretised plan of action. The awareness generated by the new Education Policy should, therefore, be utilised for achieving health related objectives.

2.5.4 Following operational strategies are recommended in this connection:

2.5.4.1 7th Plan formulations of integrated planning and coordinative implementation on decentralized and participative basis may be initiated in areas of health and education. Integrated Area Development Model with suitable changes and modifications may be considered for the purpose.

2.5.4.2 Active participation of the community, a commonly accepted intervention strategy both by Health and Educational policies, should be strengthened through the village committees, learner groups, and proposed centres for continuing education in rural areas and District Boards of Education, as envisaged in the

National Educational Policy.

2.5.4.3 District Institutes of Education and Training and Institutes in Health Sector should develop integrated Training modules for various categories of field workers in both the sectors and organise orientation programmes accordingly.

2.5.4.4 Voluntary Organisations are playing a vital role in the processes of implementation of national objectives in Health and Education. Strengthening of this mode of delivery mechanism is emphasized by both the Policy documents. It is recommended that a coordinative machinery be set up at the national level, to devise methods and procedure for generation and development of holistic programmes, with appropriate financial assistance.

CHAPTER III

HEALTH MANPOWER NEEDS AND RESOURCES

3.1 Health Planning: System approach.:

3.1.1 To achieve and attain the goal of Health for All By the Year 2000 AD health services in the country are being organised on a 4-tier system:

- (i) at the village level; training and deployment of village level workers;
- (ii) Establishment of the sub-centre for a population of 5,000 in the plains and 3,000 in difficult areas like the tribals and the hilly areas or desert areas;
- (iii) Establishment of a Primary Health Centre for a population of 30,000 in the plains and 20,000 in the difficult hilly and tribal areas; and
- (iv) Establishment of a Community Health Centre for a population of 1,00,000 with provision of referral link services. Such a Centre would function as a rural referral hospital for 3-4 Primary Health Centres, and will be provided with indoor facilities of 30 beds. Such a centre will provide investigative facilities in the shape of clinical laboratory and an X-ray unit. Such a Centre will also provide first line specialists' services in the specialties of medicine, surgery, paediatrics (child health) and obstetrics and gynaecology.

3.1.2 Till date, the following number of personnel/institutions have been established:

- 1 Village Health Guides : 3.8 lakhs;
- 2 Trained birth attendants: 5.1 lakhs;
- 3 Number of sub-centres established : 83000 by the end of 6th Five Year Plan;
- 4 Number of Primary Health Centres established : 11500 by the end of the 6th Five Year Plan; &
- 5 Number of Community Health Centres established : 650 by the end of the 6th Five Year Plan

3.1.3 It is proposed to establish another 50,000 Sub-Centres, 12,000 Primary Health Centres and 1,500 Community Health Centres during the 7th Five Year Plan. To ensure the establishment of these institutions, adequate funds have been provided in the Central and State

Sectors. These institutions will be further supported by Sub-divisional/Tehsil/Cottage Hospitals/Sub-district hospitals at the Divisional/ Tehsil level of a district. There are many Sub-divisional hospitals already in existence. The Sub-divisional hospitals will be supported by a chain of District hospitals, which in turn will be linked with Medical College hospitals or an equivalent State hospitals.

3.1.4 The main instrument to achieve Health for All By 2000 AD in India has been identified as Primary Health Care which will form the base and basis of comprehensive national health care system in India. By definition :

"Primary Health Care is essentially health care universally acceptable to individuals and families in the community by means acceptable to them through their full participation and at a cost that the community and country can afford. It forms an integral part both of the country's health system of which it is the nucleus and of the overall social and economic development of the community."

3.1.5 Primary Health Care aims to meet health problems in the community and provide promotive, preventive, curative and rehabilitative services accordingly. Since these services reflect and evolve from the economic conditions and social values of the country and its communities, they will follow a pattern consistent with social norms and community aspiration. In order to make Primary Health Care universally acceptable in the community as quickly as possible maximum community and individual self reliance for health development are essential. To attain the requisite self-reliance, full community participation in the planning, organisation and management of Primary Health Care is of the essence. Such participation is best mobilised through APPROPRIATE EDUCATION which enables communities to deal with their real health problems in the most suitable ways.

3.1.6 Primary Health Care is likely to be most effective if it employs means that are understood and accepted by the community and applied by community health workers. It must cost the community and the country can afford. These community health workers include traditional practitioners where applicable, and will

function best if they reside in the community they serve and are trained socially and technically to respond to its expressed health needs.

3.1.7 Since Primary Health Care is an integral part both of the country's health system and of the overall economic and social development Without which it is bound to fail, it has to be coordinated on a national basis with the other levels of health systems as well as with the other sectors that contribute to a country's total development strategy. The Village Health Guide Scheme which is being operated in the country is destined to meet the above challenges.

3.1.8 *Component of Primary Health Care:*

3.1.8.1 The following are the 8 essential components of Primary Health Care:

- 1 Family Welfare and MCH;
- 2 Water Supply and Sanitation;
- 3 Immunisation;
- 4 Nutrition;
- 5 Control of common communicable diseases;
- 6 Health education covering common Health problems and the methods of preventing and controlling them;
- 7 Treatment of common diseases and injuries; and
- 8 Provision of essential drugs.

3.1.8.2 *National and International Commitments.*—India is a signatory to the ALMA ATA declaration of 1978, whereby it is committed to achieve Health For All By the Year 2000 AD. As a part of its national and international commitment, the following important targets have been indicated in the National Health Policy to be achieved by the year 2000 AD from its present position:

	Indicated Current Level	Goal by 2000 AD
Infant mortality	105	below 60
Crude death rate	11-5	9
Child mortality	25	10
Maternal mortality	4—5	below 2
Life expectancy at birth	54-7	64+
Life birth rate babies (%)	25	10
Crude birth rate	33-6	21
Net reproduction rate	1-34	1
Ante-natal care to mothers(%)	50%	100%
Deliveries by trained attendants(%)	50%	100%
Universal immunisation	50- 60%	85-100%

3.1.8.3 *Brief Reference to Intervention*

Strategies.—For raising the standards of health and improving the quality of life of our people, the strategies to be adopted will necessarily have to be:

- (i) Scientifically sound;
- (ii) Economically cost effective;
- (iii) Spatially universally available;
- (iv) Readily accessible; &
- (v) Socially acceptable to the community.

The technologies to be followed will have to give greater emphasis on preventive and promotive aspects of health care, and the strategies to be adopted will have to be wedded to local culture and ethos. These strategies must essentially respect the local values and customs. The main instrument of the strategy as stated earlier will have to be Primary Health Care.

3.1.8.4 *Community as a major resource.*— The essence and essential of Primary Health Care is community participation. Without the active participation of people in the management of their own health care, it will be impossible to raise the status and standard of health. As such, the community itself becomes a major resource in developing effective and efficient health service in the country. For this a massive effort towards community mobilisation for health will have to be mounted. Community awareness, community sensitisation, and community action, constitute the essential pre-requisites for well planned programme of action aimed at mobilisation of community resources.

3.1.8.5 *Health Education as an Intervention Strategy.*—The major health problems of India are related to communicable diseases, nutrition and poor environmental sanitation. To overcome these problems, a behavioural change would be needed in the people at large. Behavioural change can only be brought out by process of education—health education. As has been stated earlier, health education is one of the most important and essential elements of primary health care. The success of any health care programme to a large extent will depend on the informed involvement and participation of the community which in itself depends on effective community mobilisation.

3.2 **Health Manpower Planning for Primary and Intermediate Health Care.**

3.2.1 There has been an increasing awareness of the fact that the three components of manpower development process, namely planning, production, and management," should constitute sub-systems, which should not only integrate with each other, but should also have a functional linkage with the total health system development.

3.2.2. The basic health services infrastructure in terms of facilities for provision of primary, secondary and tertiary care in the post independence era was established as an integral part of infrastructure related to socio-economic development, namely Community Development Programme. The health services infrastructure thus established has undergone process of expansion, consolidation and modifications dictated by the launching of National Health and Family Welfare Programmes. The health manpower required to man the health services facilities as well as meet the specific needs of programmes has also undergone a similar process of expansion, modifications and consolidations. Newer categories of health manpower emerged with the launching of National Health Programmes of vertical nature. On the other hand expansion as well as diversification of medical care facilities and services i.e. the addition of specialties and super-specialties has also led to emergence of newer categories of health manpower. The resultant effect of these developments has been enormous increase in number of categories of health manpower. The Working Group on Medical Education, Training and Manpower Planning amongst seven other groups set up by the Planning Commission for the formulation of 7th Five Year Plan found as many as 189 categories of health manpower. On the other hand *the* change from unipurpose to multipurpose health workers strategy since 5th Five Year Plan was meant to reduce the number of categories of health workers.

3.2.3 The growth and development of health services and manpower over the Five Year Plan period reveals that—(a) health services and health manpower have been developing in isolated manner and without any proper linkage in temporal and spatial dimensions, (b) the process of health manpower development has not been as rational as it should have been, due probably to less concern for appropriate manpower as compared to concern for physical, technical and technological facilities; (c) there has not been a proper balancing between planning, production and management dimensions of health manpower development process and (d) there has been far less a concern, almost amounting to negligence, for the planning and production of allied health professionals" as compared to that for medical manpower. Indeed, the primary reason for this being the medical bias in the entire process of health system planning and health manpower development.

3.2.4. On the last dimension, in so far as medical doctors are concerned, health organisations have been quite alive to the need for having ^ estimations of current stocks, supply and projected manpower requirements'. Such estimates are presented more or less regularly in the publications of Central Bureau of Health Intelligence. Research Organizations like

Institute of Applied Manpower Research, National Institute of Health and Family Welfare and Indian Institute of Management at Bangalore etc. have also keen interest and have conducted a number of studies in this dimension. However estimations of allied health professionals (para-medical and auxiliary manpower), except to some extent in relation to nurses, have not been made either by service or research organisations.

3.2.5. In the task of making estimations for the existing and projected health manpower needs, there are a number of problems such as (a) highly inadequate information system in health, (b) lack or laxity in registration systems including inadequate functioning of various professional councils which could provide estimates of current stock, (c) inadequate information on training infrastructure and outputs from educational and training institutions which could provide valid estimates supply, (d) lack of information on migration, death rates and attrition on other grounds etc. and (e) methodological problems related to estimation of manpower requirements.

3.2.5.1. In fact, there is no universally accepted method of assessing the future requirements of health professionals and para-professionals. The techniques of health manpower forecasting are yet at the stage of infancy. Nonetheless^ three methods are available for estimating the projections:

(a) *Normative approach.*—This is the most common method for projecting requirement of doctors and nurses. However, norms for other categories of health professionals have not yet been worked out by using this method.

(b) *Medical Service User approach.*—This approach takes into consideration the willingness and capacity of the people to pay for medical services. Demand in economic sense is related to price and would generally be limited by the financial resources of the family. Determining the expenditure to be incurred for medical services then becomes a matter for allocating limited family income among alternative uses. There is a relationship between family income and expenditure on health services. On the basis of the house-hold data on common expenditure, the prospective planning division of the Planning Commission has worked out the income elasticity of household expenditure on medical services to be 2.3. This means that if per capita income goes up by 1 per cent, the households are inclined to increase their expenditure on health services by 2.3 per cent.

(c) *Component or programmatic approach.*— Projecting the demand for health professionals on the basis of component approach requires a clear outline of the development of integrated and comprehensive medical health services in the country over a period of 1.5-20 years. If comprehensive medical and public health services are provided by the State, it is simple to determine the requirement of health professionals by a component approach i.e. on the basis of norms and patterns of staffing laid down for different types of medical and public health services in rural and urban localities of different sizes. There are limitations to developing this approach as comprehensive medical and public health service programmer have not yet been worked out. While estimating health manpower for programmatic approach, in addition to government run public and medical health services, the demands and projections for private sector should also be considered.

3.2.6 One of the major tasks before the Committee was related to estimation of paramedical and auxiliary manpower at the Primary and intermediate level of care. In the existing infrastructure for health care consisting of Sub-centre, Primary Health Centre, Community Health Centre, District hospital, teaching hospital attached to medical colleges, specialised hospitals and apex Postgraduate institution like A.I.M.S. etc., it is extremely difficult to identify the cut off point between secondary and intermediate level of care, which indeed may be, and is often, in the nature of a continuum. Fully operational community health centres, once developed and well organised, perhaps provide equal level of secondary care as is available from present district hospital. Taking into consideration the totality of circumstances, the Committee came to the conclusion that for the purpose of the task assigned to the Committee, the Community Health Centres may be deemed to be the cut off point and hence the estimation of manpower may be limited to the level of Community Health Centres.

3.2.7 Estimations of health manpower requirements with respect of para-medical and auxiliary personnel upto intermediate level of care, in the present context, Community Health Centres, based upon normative approach has been earlier made, and forms the basis of pattern as indicated below:

I. Community Health Centre	1 per 1, 00,000 Population.
Ophthalmic Assistant	1
Nurse/Midwife	7
Pharmacist	2
Lab. Technician	2

X-ray Technician/Radiographer	1
Dresser	1
II. Primary Health Centre	1 per 30,000 in plains.
Community Health Officer	1 per 20,000 in difficult areas.
Health Educator	
Pharmacist	1
Lab. Technician	1
Nurse midwife	1
Health Worker (F)	1
111. Sub Centre	1 per 5,000 in plains.
	1 per 3,000 in difficult areas.
Health Worker (M)	1
Health Worker (F)	1
IV. Village level Health Guide	1 per 1,000 Population.
Traditional Birth Attendant	1 per 1,000 Population.

3.2.8. From the point of view of sheer numbers and their importance in relation to National Health Programmes, the following categories are of crucial importance for providing health care at the Primary Health Centre and the Community Health Centre:

- (i) Village Health Guides,
- (ii) Trained Dais,
- (iii) Health Worker, Female (ANM),
- (iv) Health Worker, Male,
- (v) Health Assistants, Female (LHV),
- (vi) Health Assistants, Male,
- (vii) Pharmacists,
- (viii) Laboratory Technicians (for clinical, public health, and food and drug laboratories),
- (ix) Community Health Officers,
- (x.) Radiographers; X-Ray Technicians.
- (xi) Nurses (of different grades, categories and skills),
- (xii) Block. Extension Educator,
- (xiii) Ophthalmic Assistant,
- (xiv) General Duty Medical Officer,
- (xv) Dentists,
- (xvi) Dental Hygienists.

In addition, for National Programmes in Tuberculosis and Leprosy, trained workers and technicians of identified categories, would be required.

3.2.9. While the estimations for predefined categories of health manpower have been done upto Community Health Centre level, due recognition is accorded to the role and place of nurses in the context of comprehensive health care, and as such, the estimation for nurses have been made for the entire country based on normative approach (Annexure 7).

3.3. Viewed in the perspective described, the state of affairs with regard to current stock, supply and future requirements in respect of para-medical and auxiliary manpower is far from satisfactory. There is no bench mark survey giving the current stock. The available figures for current stock are only in respect of few categories. These figures are mainly derived from health services statistics and have the same limitations as any service statistics would have. All the same, the figures of current stock in respect of categories of paramedical manpower at primary and intermediate level of care, i.e. upto community health centre can be seen at column 3 of the Table 1.

3.3.1 The attrition on account of retirement and death etc. may be assumed to be around 15 per cent in case of nurses (on account of higher level of migration) and 10% in case of other categories annually. Thus, the stock after application of these rates by 1991 and 2000 A.D. can be seen at column 4 and 5 in the Table 1.

3.3.2. The information on supply i.e. turn out (with known limitations) from training institutions in respect of some of the categories as is available from statistics available vide publication "Para-Medical Training in India, 1985" published by Central Bureau on Health intelligence, Directorate General of Health Services in the Ministry of Health and Family Welfare, Govt. of India, can be seen at column 6 in Table 1.

3.3.3 Assuming that all the out turn joins the organised health services, the additional manpower available by 1991 and 2000 A.D. category-wise can be seen at column 7 and 8 in the Table 1.

3.3.4. Adding the numbers available in 1991 and 2000 A.D. from amongst the present stock to the out turn, the total stock available by 1991 and 2000 A.D. can be seen at column 9 and 10 in the Table 1.

3.4.1 The Committee would also wish to reiterate that health service statistics need to be improved in quality, functioning of registering bodies for health professionals needs to be mended and health manpower studies need to be mounted.

3.4.2. The existing situation is unlikely to improve significantly, until and unless definitive mechanisms in terms of creation of organisational structures responsible for health manpower development are brought into existence, in order to function optimally, such mechanising(s) must:

- (i) form integral part of Health Planning Bureaus/Ceils at Central and State. Levels which are grossly inadequate at present, and interact with similar organisations at District level which presently are non-existent;
- (ii) have equal concerns for *all* categories of health manpower and should not be heavily biased in favour of medical manpower as is the situation at present; and
- (iii) have appropriate relationship with research organisation[^]) and Councils related to various categories of health manpower or to a central coordinating mechanism.

3.5. Practitioners of Indigenous System of Medicine and Homeopathy.

3.5.1. India has the maximum number of manpower in indigenous systems of medicine and homeopathy. the services rendered by the practitioners of these systems over the centuries have, received due recognition. A significant portion of the country's medical care needs in the rural areas is presently met through the agencies of these practitioners. Despite the fact that India has a large number of practitioners in ISM&H, of whom a significant proportion are institutionally qualified and certified, this potential manpower resource is yet to be effectively drawn and optimally utilised for delivery of health care in the country.

3.5.2 *Indian Systems of Medicine for Strengthening the National Health Care System.* The National Health Policy as passed by the Parliament assigns to the Indian Systems of Medicine and Homeopathy an important role in the delivery of Primary Health Care and envisages its integration with the Modern System of Medicine in the preventive and promotive aspects of health care. In view of this and also the simplicity and comparative cost-effectiveness of the delivery of health care under these systems, these will be developed and utilised to the maximum possible extent during the 7th Five Year Plan and the period thereafter. It is necessary to identify clearly the priority areas concerning these systems and ensure provision of requisite resources so that these systems can play the targetted role assigned to them.

3.5.3 At present, there are 100 Colleges in Ayurveda, 17 in Unani, one in Siddha and over 100 in Homoeopathy. Annual admission capacity is 3750 in Ayurveda, 595 in Unani, 75 in Siddha and over 8000 in Homoeopathy. About half of the Ayurveda Colleges are under Government and the remaining ones managed by private bodies. About half of the Unani Colleges are under Government and the remaining are private institutions. The only Siddha College is run by the Government of Tamil Nadu. Twenty Homoeopathy Colleges are under Government and the remaining Homoeopathy Colleges are private ones. All the Ayurvedic, Unani and Siddha Colleges are conducting degree courses. About 30 Homoeopathy Colleges are providing degree education in the Homoeopathy, while rest are conducting diploma courses in Homoeopathy; 95 out of total of 100 Ayurvedic Colleges, 12 out of total of 17 Unani Colleges and one Siddha College are affiliated to the University; 46 Homoeopathy Colleges have been affiliated to Universities. Annexure 8 provides summary of available data regarding education, training and deployment of practitioners of ISM & H.

3.5.4 Compared to the Modern System of Medicine, the number of institutions namely district/sub-divisional hospitals and State dispensaries are very small under these systems. There are no Primary Health Centres nor Sub-centres belonging to these systems anywhere in the country. The position regarding the number of dispensaries and hospitals under the Indian System of Medicine and Homoeopathy varies considerably from one State to another. As on 1-4-1983, there were 328 Ayurveda Hospitals, 29 Unani Hospitals, 105 Siddha Hospitals (mostly in Tamil Nadu) and 119 Homoeopathy Hospitals in the country. The bed strength of most of these hospitals is small compared to the Hospitals under the Modern System of Medicine. The total bed strength is Ayurveda-13976; Unani-1405; Siddha-885 and Homoeopathy-3778. As on 1-4-1983, the total number of dispensaries were: Ayurveda-12196; Unani-994; Siddha-241 and Homoeopathy-2202. During the Sixth Five Year Plan, an option was given to the States to provide the third doctor in a PHC from Indian Systems of Medicine or Homoeopathy. But in response to this, only a few States have provided the third doctor in some of their PHCs from the ISM and Homoeopathy as indicated :

<u>DISCIPLINE</u>	<u>NAME OF STATES</u>
Ayurveda	Gujarat, Andhra Pradesh, Uttar Pradesh, Maharashtra, Orissa and Madhya Pradesh.
Unani	Andhra Pradesh and Uttar Pradesh.

<u>DISCIPLINE</u>	<u>NAME OF STATES</u>
Homoeopathy	West Bengal and Orissa.
Siddha	Tamil Nadu.

3.5.5 The Committee would wish to recommend the areas where the practitioners of ISM can be utilised. The practitioners of Indian Systems of Medicine can be gainfully employed in the area of National Health Programmes like the National Malaria Eradication Programme, National Leprosy Eradication Programme, Blindness Control Programme, Family Welfare and MCH Programme particularly the programme of universal immunisation and nutrition. To ensure that the ISM Practitioners will be used in judicious manner, it will be extremely essential to strengthen their basic training by incorporating appropriate educational components which will enable them to support the above National Health Programmes. Within the health care system, these practitioners can strengthen the components of (i) health education, (ii) drug distribution for national control programmes, (iii) motivation for family welfare, and (iv) motivation for immunisation, control of environment etc.

3.6 Metropolitan Health Services

3.6.1 As per 1981 census, 75% population of India lives in villages and 25% in cities. There is a distinct difference between the type of health services available in villages and in the cities.

Evolving demographic profile as reflected in the Seventh Plan document, shows that the urban population in the year 2000 is estimated at nearly 315 million, indicating a share of 32% in the total population. This is roughly 54% of the total addition to population in India between 1981 and the year 2000. In the context of past trends, most of the growth is expected to occur through the enlargement of existing towns.

3.6.2 Socio-economically, the urban community can be divided in the rich, middle and poor classes. The groups are fairly distinct. The rich have resources and avail the services of private general practitioners and consultants. Private nursing homes are utilised by them and dependance on community is largely for environmental sanitation. The middle class families go to the private general practitioners to a varying extent, depending on the severity of illness and the cost involved for medical care. Their major problem pertains to the diagnostic and specialist services for which they often utilise the public hospitals. This group is also conscious of the need to maintain environmental sanitation and often takes active steps to improve it

The poor have to depend fully on the public institutions and agencies not only for all aspects of health services, but also for their basic needs as nutrition, clothing and healthy housing. Health is not a priority need and even the limited services that are available to them are not fully utilised.

areas is grossly inadequate. In contrast, the tertiary medical care is well developed in the urban areas. The curative services are amply provided by the hospitals, speciality hospitals, dispensaries, private practitioners, private nursing homes etc.

3.6 3 While there has been tremendous expansion of the primary health care services in the rural areas, the provision of such health care for the under-privileged classes in the urban

3.6.4 Such imbalances are reflected in the following table, which depicts availability of hospital beds in the rural and urban areas as on 1-1-1985.

Hospitals	Rural		Urban		Total	
	No.	Beds	No.	Beds	No.	Beds
Government	952	33086	2623	313496	3575	346582
Local Bodies	115	3293	307	22005	422	25298
Private and Voluntary	876	32531	2461	106635 5391	3337	511046
Total	1943	68910	442136		7334	511046
DISPENSARIES						
Government	8912	22033	2511	4966	11423	26999
Local Bodies	2124	1840	1069	1679	3193	3519
Private and Voluntary Total	1146	1322	5464	4065	6610	3387
	12182	25195	9044	10710	21226	35905

3.6.5 Taking into consideration the totality of available data and future projections, the Committee would wish to recommend:

3.6.5.1 Since approximately one third of the total population being in the urban areas by the end of the century, there is an urgent need to revamp and strengthen the primary health care in the urban areas to provide the preventive and promotive services in a comprehensive manner.

3.6.5.2 A major emphasis should be on the creation and establishment of necessary infrastructure including beds to strengthen linkages between already established primary health care system in the rural area and the required linkages and referrals to the intermediate health care stations.

TABLE 1

Current stock, Annual outturn, supply, total stock, projected requirements and gap regarding health manpower at Primary and intermediate level of care i.e. upto level of Community Health Centre.

S.no.	Category of Manpower	Stock in		Annual outturn 1983	Supply by		Total Stock		Requirement		Gap		
		1991	2000		1981	2000	1991	2000	1991	2000	1991	2000	
	1986 IAN												
1	2	3	4	5	6	7	8	9(4 + 7)	10(5 + 8)	11	12	13	14
1.	Community Health Officer												
2	Block Extension Educator/									22,305	26,439	—	—
	Health Educator	4,915	2,902	1,124	35	175	490	3,077	1,614	28,578	33,875	25,501	32,261
3.	Ophthalmic Asstts.	951*	505	196	617	3,702	9,255	4,207	9,451	6,273	7,436	2,066	(-)2,015
4.	Staff Nurses t	162,875*	61,428	14,228	8,533*	51,198	127,995	112,626	142,223	409,246	664,623	296,620	522,400
5.	Pharmacist	24,449	14,437	5,593	4,063	20,315	56,882	34,752	62,475	34,851	41,511	99	(—)20,964
6	Lab. Technician	8,336*	4,922	1,907	1,558	9,348	23,377	14,270	25,277	34,851	41,511	20,581	16,234
7.	X-Ray Technician/ Radiogrpher	INA	—	—	609	4,872	10,353	4,872	10,353	6,273	7,436	1,401	(—)3,117
8.	Nurse Midwife	9,395	5,548	2,149	627	3,135	8,778	8,683	10,927	66,216	78,491	57,533	87,564
9.	Dreasser	651	—	—	—	—	—	—	—	6,273	7,436	—	—
10.	Health Asset. (M)	15,989	9,441	3,658	1,538	7,690	21,532	17,131	25,190	34,155	40,485	17,024	15,295
11.	Health Asstt. (F)	26,105	15,415	5,972	3,095	15,475	43,330	30,890	49,302	34,155	40,485	3,265	(—)8,817
12.	Health Worker (M)	84,122	49,673	19,244	819	4,095	11,466	53,768	30,710	136,620	161,941	82,852	131,231
13.	Health Worker (F)	95,615	56,460	21,874	15,296	76,480	214,144	132,940	236,018	158,925	188,380	25,985	(—)47,638
14.	Health Guide**	385,572	—	—	—	—	—	—	—	627,337	743,610	—	—
15.	Traditional Birth*** Attendant (TBA)	515,691	—	—	—	—	—	—	—	627,337	743,610	—	—

* Figures pertain to the year 1985.

** Being Voluntary workers, calculations cannot be done in the same manner as is applicable for other workers. t

+Calculations are based on manpower requirement for hospital nursing services.

INA Information Not Available.

+ The gaps indicated above are only in relation to the need of Primry and Intermedite Health care services. These will become much wider when viewed in the perspective of comprehensive health care system including tertiary care services, as also the needs of organized sector and private sector.

§ The requirements indicated above are only in relation to the needs of primary and intermediate health care services. A large number of the surplus will be absorbed by the organised sector and the private sector.

CHAPTER IV

HEALTH MANPOWER PRODUCTION FOR PRIMARY AND INTERMEDIATE HEALTH CARE

4.1. Field experiences and research findings at the macro and micro level have demonstrated that between health and education there is an interactive relationship and effectiveness of both sectors can be enhanced considerably by pursuing a coordinated and integrated approach. There appears to be a phenomenon of interdependence as was demonstrated during the organisation of primary health care in Jammu & Kashmir through Rehbar-i-Sehat Programme.

4.2 The health manpower requirements for primary health care must take cognisance of the fact that individuals, families and the community constitute the most important health manpower resource.

4.2.1 Educational process at all levels must aim at the incorporation of such learning experiences that may lead to a desired change in the health behaviour.

4.2.2 Universal education comprises three basic components: adult education, non-formal education, and elementary school education. It is, therefore, imperative that health-related curriculum contents must be incorporated in the learning materials and educational experiences at all these three levels.

4.2.3 Adult education programme emphasises three key elements : Literacy, functionality, and awareness. It is being implemented through several programmes, namely, Rural Functional Literacy Project, State Adult Education Programme, Adult Education through voluntary Agencies, Involvement of Students and Youth in the Adult Education Programme, Nehru Yuvak Kendra, Non-formal Education for Women and Girls, and Shramik Vidyapeeths.

4.2.4 During 1984-85 there were 186510 centres of adult education in the country enrolling more than 5.53 million adults. Of these 2.89 million were females, and 1.54 and 0.88 million adults belonged to scheduled castes and scheduled tribes respectively. The detailed statistics regarding the coverage of adult education programme in India are shown in Annexure 9.

4.2.5 The five major curricular components of adult education programme include :

- (i) Individual and Society—a social, environmental and civic orientation;

- (ii) Employment and Vocational Development;
- (iii) Food production, Distribution and Nutrition;
- (iv) Health and Sanitation; and
- (v) Home and Family Life.

The course on food production distribution and nutrition contains two units which are basically on nutrition and health. The programme on health and sanitation, and home and family life are exclusively related to health with nine units in each course.

4.2.5.1. Health-related contents in the education module on food production, distribution and nutrition include: understanding relation between nutrition and health; gaining knowledge about planning an adequate diet; the basic groups of food; cheap nutritious substitutes available locally; improving the nutrition content of traditional foods and popularising the available foods with good nutrition value. These also emphasize learning about the diets in sickness and special physical conditions; appropriate measures for feeding children, improving nutrition of women and old people in the family.

4.2.5.2. The education module on health and sanitation includes the following nine units :

- UNIT I Realising the importance of having a healthy environment, becoming aware of the health hazards in the existing environment and learning to deal with them.
- UNIT II Becoming conscious that personal hygiene is a basic requirement for healthful living and learning to maintain personal hygiene.
- UNIT III Keeping home and surroundings clean learning proper methods of disposal of waste water, household refuse, human excreta, animal dung and old and discarded articles, etc.
- UNIT IV Learning about food hygiene and its relation with health.
- UNIT V Learning to take action to get enough pure water for household and personal consumption.

- UNIT VI Learning about communicable diseases and their prevention and control; distinguishing diseases which can be treated at home; learning to take advantage of health facilities in the area.
- UNIT VII Learning about nutritional deficiency disease and methods to prevent and treat them.
- UNIT VIII Developing positive attitude to the treatment of diseases; learning to take care of sick persons in some common diseases like fever, flu, cold, stomach-upset etc.
- UNIT IX Understanding causes and prevention of accidents at home and outside; learning some first-aid and emergency care.

4.2.5.3. The education module for home and family life include the following nine units:

- UNIT I Becoming aware of the home and family life situation, both at the Country and local-level; its genesis and roots; its recent developments and deformation.
- UNIT II Gaining awareness about inequalities in family; learning about the status of women in the society and the efforts to improve it.
- UNIT III Learning about the preparations necessary for marriage and parenthood.
- UNIT IV Learning about the 'Why' and 'How' of family planning.
- UNIT V Learning about the different modes of living and techniques of appropriate home-management.
- UNIT VI Learning about suitable clothing for the family, its provision, upkeep and storage.
- UNIT VII Learning about the relationship between the methods of preparation of food and good nutrition, learning proper and hygienic methods of handling, preparing and cooking food.
- UNIT VIII Learning about maternity and child-care.
- UNIT IX Concerns about conflicting situations in the family and learning how to maintain good family relationship.

4.2.6 Non-formal education is the major thrust area in the educationally backward States and includes a large operational network. The numbers of centres and enrolments in each of the nine educationally backward States as an index of coverage of non-formal education programme, are shown in Annexure 10. A total of approximately 3.5 million children are enrolled in the non-formal education programme; of these about 1.3 million are girls. All students in the non-formal education belong to the age group 6-14 years. The health-related learning component of non-formal education is similar to, although not identical with the corresponding component of elementary (primary and upper primary) education.

4.2.7. The elementary education is the largest operational network of the education system in the country, comprising of approximately 6 lakhs institutions, and a total enrolment of more than 95 million children in the age specific population.

4.2.8. Incorporation of meaningful learning experiences related to health component in universal education can, therefore, reach quickly and effectively to a large mass of population, constituting a major means of health education to the community. Topics such as human body, nutrition and health, diet and exercise, personal hygiene, environmental sanitation, introduction to structure and function of human body, and communicable diseases are covered at various levels in the primary and upper primary education.

4.2.9. Action strategies need to be evolved to make health education more pervasive, with potential of making a discernible impact on health-related behaviour of individuals, families and communities. The possible areas of intervention include review and restructuring of curriculum so as to build demonstrable action points as key learning experiences.

4.2.9.1 The socially useful productive **work** (SUPW) experience needs to be redesigned so as to effectively demonstrate interdependence of literacy, social and family welfare, and health.

4.2.9.2 Health component, with well structured pedagogic inputs, needs to be incorporated in the teacher training and educational curriculum.

4.2.9.3 There is a paucity of educational software of health which could be effectively used in the mass media technology. A coordinated effort by several agencies in different sectors alongwith that of voluntary professional organisations working in health and education, needs to be initiated to meet such software demands for community health education.

4.3 Pre-Vocational Education.

4.3.1 A review of the curricular contents of primary and upper primary (Grade I-VIII) would indicate that health as a component of education has been included at all levels. The curriculum has also been built with a logical sequence of simple, but relevant, concepts like 'our family and cleanliness' in the first to third grades progressively reaching to complex issues like growth, reproduction, heredity, human welfare etc. at VII and VIII grades." In grade IX science curriculum life processes, human biology, health and nutrition have been included. The Central Board of School Education provides a full programme on Health and Physical Education.

4.3.2. The present practice or methods of implementing the health component leave much to be desired. The situation is due to lack of proper orientation, skills and attitudes towards these themes among instructors and teachers. It would be necessary to strengthen the health related education component, at all levels especially in grades X and IX. Such strengthening would call for emphasis and change in methodology of instruction of these themes with a view to adding demonstrable learning experiences, rather than inclusion of some more topics. Suitably modified, these courses should lay strong foundations for vocational course on health at +2 stage.

4.4 High/Higher Secondary Education: Vocationalisation:

4.4.1. The National Policy of Education of 1968 envisaged the need of introducing radical changes. One such attempt was to introduce vocationalisation of higher secondary education. It was conceived that there would be two equal streams at the +2 stages, each carrying around 50% of the total students. It was expected that the vocational stream, over a period of time, will become a major outlet for the development of socially relevant skills, thus generating not only a pool with a high employment potential, but also aiming to supply the manpower needed for developmental activities both in the private and the public sector in the country.

4.4.2. The Programme of vocationalisation has been introduced in nine States and four Union Territories since 1976 as a part of educational reforms envisaged under the 10+2 pattern of education. The vocational courses offered in different States can be grouped under 6 major areas: Agriculture, Business and Commerce, Home Science, Health and Para-Medical, Engineering and Technology and Humanities. The total number of Institutions conducting vocational courses at the plus two stage and the enrolment therein are given in Annexure 11.

4.4.3. The document, Challenge of Education : a policy perspective, amply reflects the sad state of affairs in this area :

"It has been stated by many experienced teachers that vocationalization within the secondary school system has been a casualty at the hands of educational planners who have no insight into either the opportunities of employment or the type of expertise required for vocational employment. Consequently, in planning for training of teachers, preparation of curricula, selection of courses, all initiatives have been characterised by a lack of professionalism. Naturally, therefore, adequate financial resources have neither been demanded nor provided for starting viable activities in this field. It is paradoxical that while lack of skilled manpower at-the

middle level is generally perceived to be a major obstacle to raising productivity and economic growth, growth of vocationalization has been stunted from the very inception of the programme."

4.4.4. While it is true that the educational planners have no insight into either the opportunities of employment or the type of expertise required for educational employment, it must also be confessed that health sector and more significantly, the educationists in health sciences never saw the tremendous opportunity that vocationalization offered for health manpower development for middle level workers.

4.4.5 Accordingly, in health-related areas, only a modest beginning has been made in the States of Tamil Nadu, Maharashtra, Karnataka, Andhra Pradesh, West Bengal and the Union Territory of Delhi. The list of courses and the States/Union Territories in which they are offered are given below

TABLE 2

Para-medical Courses: In States/Union Territories

Sr. No.	Course Title	Introduced in States/ U.T.s
1.	Pharmacy	Andhra Pradesh, West Bengal.
2.	Ophthalmic Technician	Tamil Nadu, Delhi,
3.	Optician and Refractionist.	Karnataka.
3.	X-Ray Technician	Karnataka.
4.	Medical Record Technician	Karnataka.
5.	Multipurpose Health Worker (Male)	Karnataka, Maharashtra.
6.	Multipurpose Health Worker (Female)	Maharashtra.
7.	Elementary Laboratory Technology Medical Laboratory Assistant/Medical Laboratory Technician/ Laboratory Technician.	Tamil Nadu, West Bengal, Pondicherry, Karnataka, Maharashtra.
8.	Dental Hygienist	Andhra Pradesh, Tamil Nadu.
9.	Dental Technician/ Dental Mechanic.	Andhra Pradesh,,
10.	Hospital House-keeping.	Tamil Nadu
11.	Nursing	Tamil Nadu.
12.	Multipurpose Health Education.	West Bengal

4.4.6. The Pharmacist Course offered in Andhra Pradesh is recognised by the Pharmacy Council of India and Institutions offering the Course have been accorded provisional recognition subject to the provision of teachers and

laboratory facilities as per the standards of the Council. The Dental Hygienist and Dental Technician Courses in Andhra Pradesh enrol students in a Junior College, but are attached to the Dental College at Hyderabad where theory and practical classes are held. The College faculty is responsible for instructions in these Courses while other subjects are taught in the College itself. The Course design in respect of these Courses is such that it aims at the development of employable skills while building up sufficient theoretical base for the practical aspects of the vocation.

4.4.6.1. These courses have been recognized by the State Medical Health Services Department and products of these courses are appointed in the scale of Rs. 450-700 p.m. as pharmacist Grade I, Dental Hygienist, Dental Mechanic and Laboratory Assistant.

4.4.7. Karnataka has established a separate Directorate of Vocational Education for organizing and implementing the scheme. This State has constituted a Council of Vocational Education which is the advisory body to the Government on all academic issues concerning proper development of the system. The State Council of Vocational Education conducts examinations and declares results, issues diplomas, prepares scheme of examination and revises syllabi for courses.

4.4.8. Karnataka had introduced six courses in the field of para-medical group. They are laboratory technician, X-ray technician, medical record technician, optician and refractionist, multipurpose basic health worker and psychiatric nursing assistant. At present, only five courses are in operation. The course on psychiatric nursing assistant seems to have been dropped due to very poor enrolment.

4.4.9. In the short time available to the Committee, intensive efforts were made to obtain data on the employability potential of those qualifying health-related vocational courses (H.R.V.C.). Karnataka is one of the few States where employment opportunities for vocational products are found to be satisfactory. In order to facilitate employment the State Government has taken steps to get recognition from the employment sector for these vocational courses. Department of Health in Karnataka has already recognised three of the five para-medical courses introduced so far. These are courses for Laboratory Technicians, X-ray technicians and Medical Record Technicians. These posts have been designated as junior laboratory technicians in the scale of pay of Rs. 630 to 1200 and Rs. 675 to 1320. Employment scenario of passed out students of vocational courses at plus two stage in the year 1985-86 is given below:

Name of Vocational Course	No. of Students Passed	Among the students passed number			
		Employed In Govt service.	Employed in Private organisation	Taken self emp.	Joined Degree Classe
1. Laboratory Technician	91	10	22	02	06
2 X-Ray Technician	137	25	47	07	29
3. Medical record	69	05	12	02	26
4 Optician And refractionist	52	01	01	02	09
5 Multipurpose Basic Health Worker	105	05	23	01	56

The demand for para-medical vocational courses in Karnataka seems to have gained popular acceptance

4.4.10. Adequate measures have been adopted to safeguard the standard of para-medical courses to suit the requirements of the health sector. Provision has been made for one whole-time teacher with medical qualification for each health-related vocational course, with a number of part-time teachers depending upon the nature, number of courses and number of students enrolled in each course. The students are attached to hospital for practical work and theoretical instructions in respect of the vocational courses are organized by the junior colleges enrolling the students, and health department.

4.4.11. In Tamil Nadu vocationalization has been introduced in 1978-79. During 1984-85, out of 3,31,572 students in standards XI and XII, 61,502 students offered the vocationalization stream in 969 schools. For the implementation of vocationalization programme, a special cell has been set up in the Directorate of Education for giving necessary directions, guidance and information. A high power committee for this purpose has also been set up with advisory function

4.4.12. On a request from the State education department, health department has instructed the district and institution level heads to provide infrastructure facilities and expertise available with them to the education sector for implementing training programmes of paramedical courses at plus two stage in schools. Permission has also been accorded for holding

classes in the place of normal work of part-time instructor such as dispensaries, medical laboratories, and hospitals, and primary health centres. The Heads of Departments have been authorised to permit their staff to serve as part-time instructors and to receive remuneration. Even retired personnel with appropriate skills are appointed on short-term basis.

4.4.13. Tamil Nadu has introduced five paramedical courses so far. Following table depicts the enrolment picture along with the number of institutions in the year 1985-86 :

TABLE 4

Vocational Courses	No. of Schools	Enrolment Figure		
		Boys	Girls	Total
1. Dental Hygienist	1	..	24	24
2. Hospital Housekeeping.	1	..	13	13
3. Medical Lab. Asst.2413	9	269	274	543.
4. Nursing	88	96	325	9 3355
5. Ophthalmic Technician.	1	..	2	2
Total	100	365	3572	3937

Nursing course seems to be the most popular amongst para-medical courses in Tamil Nadu. There is a significant increase in enrolment from 1539 in 1982 to 3-355 in 1985.

4.4.14.. To facilitate vocationalization, decentralised planning system has been adopted by the State. The institutional head has been made the "kingpin" of the scheme. He is given freedom with regard to identification of courses, developing linkages with other departments, planning and implementation of coordination between two or more departments, planning and selection of instructional material, appointment of whole-time and part-time teachers, "making appropriate adjustments in calendar of academic activities and lime table to facilitate instructional process and staggering of instructional hours and days to accommodate the availability of experts from the vocational field who participate in the academic programmes.

4.4.15. To provide vertical mobility to the product of vocational courses, provision is made by allowing them admission in technical and professional institutions. Products of technical courses are admitted to second year of polytechnic and 10% seats are reserved for them. Products of nursing course are admitted in the B.Sc. (Nursing) in second year of the course.

4.4.16. Students enrolling for various vocational courses in Andhra Pradesh are given in Table 6.

TABLE 6

	1981	1982	1983	1984	1985
Pharmacy	117	121	194	201	298
Dental technicians	..	6	6	11	10
Dental hygienists	..	2	9	11	13
Lab. Technicians	..	4	7	6	11

4.4.17. Comparable data with respect of health-related vocational courses is not readily available from other States. However, there is information to indicate that in Maharashtra and West Bengal less than 50% of the total Instructional time is devoted to vocational theory and practice, as against 70% of such time being made available for this purpose in the States of Karnataka and Tamil Nadu. Further, in Maharashtra, vocational education follows a bifocal model, implying that the students have equal opportunities either to seek employment and pursue a career at the end of +2 stage of vocational course, or to join an education institution for degree programme in any stream.

4.4.18. In-depth review of the available data regarding course construction, curriculum development, learning settings, learning experiences and methods of evaluation indicates that there is considerable variability not only amongst States, but within States in relation to different health-related vocational courses in all these aspects. It is also abundantly clear that the preparatory work made for the implementation of such courses in the country has been woefully inadequate. Furthermore, no significant efforts have been made to involve medical and allied health professionals with educational background in development and construction of such courses. No efforts have been made to ensure quality control with respect of those courses which are presently being conducted both by the education as also by the health sectors. No major effort has been made to get proper recognition from the health department for such courses so as to ensure employability of those found suitably qualified. This may be partly because of the fact that methods of evaluation appropriate to the task analysis have not been developed.

4.4.19. Recently, efforts have been initiated by the NCERT in the area of curriculum development. The main thrust has been to develop course curricula on the basis of job requirement and task analysis. The competency based curricula, listing the competencies under cognitive, psychomotor and affective domains, have been developed for a limited number of health and para-medical courses. As per the strategy adopted by NCERT curriculum development is done by the workshop method involving subject experts, employers and teachers.

4.4.20. The report of the National Working Group on Vocationalization of Education (Kulanandaiswamy, 1985) provides the following details of financial inputs for unit of 25 students/para-medical Course:

	Rs.
1. Non-recurring (5 years) :	
4.4.14. Building (30-i- 50 m)	80,000
4.4.15. Equipment	60,000
4.4.16. Library	7,000
Total	1,47,000
2. Recurring/Year :	
(a) Full-time Staff—1 (Rs. 600-1400 scale)	20,000
(b) Part-time Staff—1 (Rs. 30-50 per lecture)	6,000
(c) Laboratory Assistant —1 (Rs. 410-700 scale)	9,000
(d) Contingencies	10,000
(e) Raw materials	10,000
Total	55,000
Per Student/per year	2,200

4.5 Health Manpower Production through Health Sector.

4.5.1. Having identified the categories of health manpower which are needed in large numbers and having considered the potential of the education sector to meet with these requirements through health-related vocational courses at +2 stage, it may be appropriate to briefly review the current status of training and education of these categories by the existing institutions through the health sector.

4.5.1.1. The training of Village Health Guides is being conducted at Primary Health Centres. The objectives of courses of instruction have been defined and training manuals have been prepared.

4.5.1.2. There are 515,691 traditional birth attendants presently working in the country (Table 1). There is a well recognised need to train all the untrained dais in the country to provide better maternal care and natal services. Based on this assumption another 2-3 lakhs dais need to be trained. Such training will also be carried out at the Primary Health Centres and even at the Sub-centres, with active assistance and support by the LHVs and ANMs.

4.5.1.3. The total number of ANMs (now called Female Health Workers) is shown in Table 1. It is estimated that the requirement of ANMs for the 7th Five Year Plan period would approximately 1,30,000 indicating the need for education and training of an additional 50,000. The number of ANM Training Centres in the country as on 1-4-1984, with total admission capacity is shown in Table 7.

4.5.1.4. The training of Male Health Workers (Multipurpose) is envisaged to be conducted at the Regional Family Welfare Training Centres by suitably increasing their physical and educational facilities. At the present moment about 30 Institutions are imparting training to male workers with a capacity of about 2,000 per year. This capacity is grossly inadequate to meet the future demands for 1,30,000 Sub-centres stipulated to be established during the 7th Plan period.

4.5.1.5. The number of Institution and annual admission capacity for other categories of health manpower already referred to, is shown in Table 7.

4.6 Recommendations.

4.6.1. The Committee strongly recommends health-related vocational courses for the following categories of health manpower ;

- (i) Auxiliary Nurse Mid-Wife (ANM)/ Multi-Purpose Health Worker, Female.
- (ii) Multi-purpose Health Worker, Male.
- (iii) Radiographers/X-Ray technicians.
- (iv) Laboratory technicians (for clinical, public health, Food and Drug Laboratory).
- (v) Ophthalmic Assistants/Refractionists.
- (vi) Dental Hygienists.
- (vii) Pharmacists.
- (viii) Hospital House Keepers.
- (ix) Occupational Therapists/Physio-Therapists.
- (x) Sanitary/Health Inspectors.

4.6.2. The Committee is of the considered opinion that an in-depth review of education and training facilities for the above categories of personnel should be undertaken.

At present, the training of these workers is being undertaken in some Higher Secondary Schools, particularly in the States of Karnataka, Andhra Pradesh and Maharashtra as a part of vocationalisation organised by the education department. But in most of the cases and in most of the States, the training of these professionals is being conducted in schools/institutions especially designed for them or in association with existing institutions, mostly medical colleges/institutions, through health department. It is, therefore, mandatory that appropriate linkages and coordination must be developed between the health and education departments in every State, with establishment of Coordination Committees at district level.

4.6.3. The Committee recommends that the course of instruction presently being organised by the health department should be reorganised so as to be equated with the 10+2 system. To do so, a curricular mix will have to be

evolved wherein languages and related subjects including science, mathematics and humanities etc., etc., shall constitute about 25-30% of the total period of instruction, while vocational theory and practice, including on-the-job training will occupy the remaining 70-75% of the total allocated time. While the facilities available in the higher secondary schools can be provided for the courses of instruction in science, mathematics, humanities and languages, the infrastructure available at the schools of training for allied health professionals – like ANMs may be used for imparting the vocational component of the health-related courses. The Committee recommends that a small sub-committee be appointed to work out a detailed plan of action. While the Committee would wish to emphasize maximal utilisation of existing facilities irrespective of the sectoral denomination, a provision must also be made for ensuring adequate financial outlays to generate requisite infrastructure both in material and manpower resources

4.6.4. It is recommended that the entry point for all the above courses should be after the stage of 10th standard. The +2 stage of two years can conveniently be broken into 4 Semesters in which general educational and vocational courses of instructions can be imparted to the para-professionals indicated above. The Group recommends that the first year of the 10+2 system, that is, the first two semesters should be for a common core curriculum for all types of para-professional workers. During the third semester, □pecialized areas should to included in the training of specific categories of personnel whereas the 4th semester should be for practical training and work experience in the chosen area of para-professional voca-tionalisation.

4.6.5. It is recommended that for these co-ordinated/integrated training courses, the faculty from the disciplines of Biology, Physics, Chemistry be drawn from the existing secondary schools. These schools can also provide faculty support for instruction in languages and humanities, whereas the instruction in health sciences could be easily imparted by part-time faculty members drawn from the existing district hospitals, training schools and institutions, medical colleges etc., wherever available and even from retired health scientists. “Transfer of credits on the basis of common modules of instruction at the +2 vocational level needs to be ensured on a uniform basis so as to widely applicable throughout the country.

4.6.6. In view of the curricular mix of language and humanities courses as a part of + 2 vocational education, the students should be able to pursue higher courses of training in medical and other professional colleges and universities, either at the end of +2 stage or after 3-5 years of work experience in the chosen

vocation, This would provide incentive for joining health-related vocational courses at +2 stage.

4.6.7. It is recommended that the Government may consider award of stipends/scholarships to students pursuing health vocational courses. Such awards should be based on merit-cum-means, and would further add to the incentives for such courses. In order to facilitate employment of those qualifying health-related vocational courses, the Committee strongly recommends that the State Governments should initiate steps to secure recognition from the employment sector for these courses. Departments of Health, following appropriate assessment, should take a lead in according such recognition.

4.6.8. As the teachers of vocational course are drawn from two distinct categories of discipline i.e. general and medical education, there should be a shared awareness and concern for the educational requirement of the students. The part-time staff of even highly qualified professional people as well as whole time teachers would require appropriate orientation in instructional techniques and evaluation. To keep full-time teachers abreast of the latest practices, periodical refresher training will have to be conducted.

4.6.9. The teachers should be made aware that para-medical vocational education should not only focus attention *to train* the students for acquisition of skills, attitudes, understanding and knowledge relating to specific para medical vocation, but should also aim *to educate* them in a manner that it should lead to :

- (a) an understanding of the emerging trends in the field of health at the national and international level;
- (b) the comprehension of the social, political and environmental implication of scientific and technological change;
- (c) the establishment of a new relationship between education, working life and the community as a whole; and
- (d) the appreciation of vocational education as a part of system of life-long education adapted to the needs of one's own society.

4.6.10. Most important, the teachers should bear in mind that the vocation should not lead to the cul-de-sac of a mechanical life but should aim for a life of mission as well as of personal growth. A proper appreciation of the vocational course as well as teaching of non-vocational component so as to make" it relevant to the chosen vocation, requires that the concerned teachers of general education also need appropriate training aimed at generating awareness of job opportunities and task requirements of the vocation, and of the general outline of the content of vocational component.

4.6.11 For effective educational planning of para-medical vocational courses, there is need for proper assessment of District-wise State-wise and Nation-wise para-medical vocational manpower requirement. The choice of vocation for manpower production at District level or State level should not, however, be based on need assessment alone, but also on regional employment capabilities of the employing agencies at District and State level, both in the public and private sector, self-employment possibilities, prior recognition of the courses by competent authority, and establishment of proper linkage between technical collaborating and educational institutions. The Committee would wish to endorse the recommendation of the National Working Group on Vocationalization of Education regarding establishment of the National/Joint Council for Vocational Education and State Councils of Vocational Education, and would recommend an effective inter-linkage of such councils with the proposed Education Commission of Health Sciences and Regional or State Universities of Health Sciences.

4.6.12 A vocational curriculum, to be need-based, must be developed • through proper identification of minimum vocational competencies required in the job market by experts through systematic analysis of manpower supply, demands and projections; tasks and duties demanded in those jobs; and the requisite skills for various tasks/duties to be performed.

4.6.12.1. "Minimum competencies based curriculum" will not only act as a corrective measure by way of helping In the process of revision of curricula already in operation in the States presently implementing vocationalisation but it can also accelerate the process of introduction of such courses in other States which are going to launch the programme, by providing readymade material.

4.6.12.2. Guidelines need to be prepared so as to provide necessary information on various aspects of programme implementation; reference materials: selection of teachers; training facilities; learning aids and settings etc. These will be of considerable use to curriculum planners, authors of instructional materials, supervisors, teachers, students and employers.

4.6.12.3. The curriculum should be flexible enough to provide local variation for adaptation related to specific needs.

4.6.12.4. If the same team which is responsible for planning the curriculum can develop the guidelines as well as instructional materials (text-cum-practical manuals, supplementary readers, self-learning materials), not only the continuity of educational process is maintained, but much time would be saved in the final dissemination of such materials. A major effort also need to b: initiated to develop instructional materials in regional languages.

4.6.13. There is great variation in between different States, in the pattern of vocational courses and the credits accorded to different components. Consequently, the products supplied by different States differ so far as attainment of skills are concerned. For the establishment of a national standard of health services, it is desirable to ensure the development of a national norm of standards for each vocation.

4.6.14. Maintenance of standards of such a vital segment as allied health professionals is, therefore, very necessary. Proper evaluation measures during, and following the completion of courses of instruction, cannot only ensure standardization of educational process but also of the quality of the product, thus leading to appropriate recognition by public and private sector, and regional and central employing health institutions. Exercise of 'quality' control of the process of education, as also of its product, indirectly helps in the elimination of non-standardized products of unauthorised institutions, thus preventing a backdoor entry into health services, and jeopardising establishment of health service standards in the country.

4.6.14.1 In a vocational area, achievement of goals in the cognitive domain is as important as that in the psychomotor domain, because an allied health- professional has to demonstrate a homogenous blend of knowledge, skills and behavioural attitudes. As there is an intimate interaction with suffering human-beings, such a para-professional is expected to serve as a bridge between common man and professional expert; thus, attainments in the affective domain also assume significance. It is, therefore, necessary that evaluation of para-medical personnel, both formative and summative, must be comprehensive so as to test his vocational competencies of knowledge and comprehension, psychomotor skills and attitudes, with balanced assignment of credits.

4.6.14.2. To evaluate the attainment of competencies in these three domains, a comprehensive framework of evaluation with appropriate tools and techniques for each vocation, need to be developed.

4.6.14.3. Evaluation of psychomotor skills and personality traits (attitudes) in general education and much more so in vocational education, has not attracted as much attention of the evaluators as in the case of written examination which primarily aims at the assessment of cognitive domain. It is, therefore, time that serious thought is given to this vital aspect of evaluation which constitutes the very essence and foundation of health services.

4.6.14.4. To streamline process of evaluation and make it meaningful and effective, a Committee for each health-related vocational course, consisting of specialists, professionals, teachers, evaluators and evaluation experts should be

constituted. This Committee should specifically focus on:

- Development of guidelines, framework, methods, tools and techniques of evaluation; and
- Testing, validation, refinement and updating of the above.

4.6.15.1. An all encompassing plan should be drawn up intersectorally for health manpower

production, deployment and sustenance. Three tier interlinkages are suggested—

- (a) *Central level.*—The Ministries of Health and Education should evolve a strategy of the extent of vocationalisation, draw up essentials of a core curriculum valid for the whole country, decide employment potential, evolve training of the trainers, preparation of teaching materials, identify course objectives and contents.
- (b) *State level.*—The Health and Education departments should jointly follow the guidelines provided by the centre, identify the need of various categories in the state, allocating various categories to +2 schools and identifying the collaborating hospitals/institutions, providing training of teachers of the vocational courses and develop local need based instructional materials. They should make budgetary provisions for the educational process and programme content as well as for absorption of successful candidates. Evaluation/examining bodies need to be constituted.
- (c) *Local institutional level.*—The school authorities must interact with the hospital/institutional authorities for efficient coordination and conduct of the courses of instruction with built-in provision of close monitoring and evaluation mechanisms

TABLE No. 7

Number of Institutions and Admission Capacity/No. Admitted in different Para Medical Courses: 1983

SL. No.	Description of the course	No. of Institutions	Admission Capacity / No. Admitted
1	2	3	4
1-	Nurses General	324	7750
2.	Aux. Nurse Midwives	339	6006
3.	Midwives	276	7539
4.	Health visitors	21	835
5.	Dental Hygienist	9	71
6.	Dental Mechanics/Technicians	8	54
7.	B.Sc. (Med. Lab. Technicians)	13	105
8.	Lb. Tech. /Lab. Asstt.	78	1558
9.	Sanitary/Health/Malaria Inspectors.	30	3095
10.	Pharmacists	105	4063
11.	Radiographers	36	400
12.	X-ray Technicians	22	209
13.	Opertional Therapist Asstt.	6	55
14.	Physiotherapist	7	146
15.	Occupational Therapist	5	121
16.	Speech Therapist	2	13
17.	Orthopist	2	12
18.	Optician & Refractionist	26	617
19.	Health Worker (Male) under M.P.W.	15	819
20.	Miscellaneous	27	721

NOTE: Data in respect of SNO 5 to 20 relates to the period as on 1-1-1983.

CHAPTER 5

HEALTH MANPOWER MANAGEMENT

The health manpower which has been planned, and produced accordingly must also be properly utilised (managed) for maximal effectiveness of the health services. Management sub-system provides for mechanisms for the employment, retention, support and development of the health care personnel. While this report aims at providing a basic strategy and essential outline of a plan of action, details of an action programme need to be further worked out at the national level taking into consideration the health care needs of the country.

5.1 Employment

For optimal utilisation of health services, it is imperative that role of each category of health manpower should be classified. This may be done through delineating job descriptions, training and through participative approaches.

5.1.1. *Job descriptions.*—A job description is a statement of the basic purpose of the job, the significant tasks to be carried out, authority vested in the job and the upward, downward and horizontal relationships necessary for the performance of the job. Specification of the tasks and responsibilities of the job should form the basis of both new appointments and promotions. The job description should also provide the yardstick for performance evaluation and also provide the basis of curriculum revision.

Job descriptions may also hinder effective **performance** in that the workers may feel that they should not do anything other than what is given in their job descriptions. To avoid this pitfall, job descriptions must be seen as guidelines and not as strait-jackets. The Committee recommends that the job descriptions should be standardized for each category of health manpower and these should also be subjected to a regular review with continual evolution of health workers roles. Sample job descriptions are provided in Annexure 12.

5.1.2. *Establishment Control*—Establishment control is concerned with the authorization of health worker posts in different cadres, services and locations. The efficient delivery of health services requires continual adjustments in the distribution and use of resources to cater for changing demands, unexpected problems and opportunities. Though the control of these

establishments may be with the central authorities, authority may be delegated to managers at the State level or local level for optimal deployment of the workers.

5.1.3. *Recruitment procedures.*—Recruitment procedures include the processes and the methods by which vacancies are notified, posts are advertised, applications are handled and screened, interviews are conducted and appointments are made. Recruitment covers both the filling of new posts and replacements for previously established posts which fall vacant. It includes the filling of posts from both internal and external candidates. Information of vacancies and employment opportunities should be provided to all relevant training institutions, to attract a wide field of duly qualified applicants. Here also, the strategy should be to decentralise recruitment within the framework of centrally enunciated guidelines for proper deployment of the newly recruited personnel. However, there should be uniformity in recruitment procedures.

5.2 Retention

5.2.1. *Career structure.*—wherever possible, career structure for all cadres should provide the opportunity for all workers to gain promotion at least twice in a 30 year working period. The Committee recommends a constant review of career structures keeping in line with emerging and evolving health care strategies and operations.

5.2.2 *Promotion procedures.*—Each grade within a career structure should have clearly recorded job description and a specification of qualifications and experience required on the post holder. Promotion in all cases should be based on whether the individual meet:- the requirements, as specified in the job description

However, promotional opportunities for most of the categories of paraprofessionals in the health fields are limited in India. This swan-neck situation, especially in the lower categories causes a great deal of frustration. It is recognised that the performance of health workers deteriorated with length of service in one designation. The Committee recommends that central guideline be enunciated for a cadre planning with promotional avenues both for vertical movement and a lateral induction, based on seniority and merit,

5.2.3 *Living and working conditions.*—inadequate living and working conditions in rural areas have led to the spatial distortions. These inadequacies increase the sense of isolation — both physical and psychological of rural health workers. In the overall planning, attention must be given to provision of adequate living and working conditions for optimal performance and job satisfaction of the rural health workers.

5.2.3.1 Another important facet to be considered is the horizontal spatial mobility after few years of service in one region, so that the employee could look forward to posting in an easy area, when his family is growing up, so that he could discharge his duties towards his children more effectively.

5.2.4 Salary structure should be uniform for the same category, all over the country. In order to remove the spatial distortions between rural and urban health services, incentives must be given by way of allowances and better fringe benefits to make the rural service more attractive.

5.3 Supporting

5.3.1 *Supervision* — Besides ensuring an effective and efficient performance of duties by the staff, a supervisor should also help and guide the staff in the performance of their duties, detect and remove lacunae in the performance and also to train them in such a way that they become more competent in their work. The supervisor should also assess the skills acquired by the health worker in the training courses attended by him. Any inadequacies should be duly reported to the educational institutions for a further review of their curricula and teaching modalities.

5.3.1.1 Assessment should be objective and continual. It should not be in the usual style of ACRs, but be totally dependant on job performance. In general, an annual performance report (APR) should replace the present system of ACR. The worker should be asked to fill in his performance vis-à-vis his job description and the supervisor should critically evaluate his work, performance.

5.3.1.2 The role of supervisor should cover programming and review, assessment and support, control and development.

5.3.2. *Communication and consultation.*— Effective communication must exist between the staff of all levels working in the health programmes. All workers at all levels must be made to feel that they are important and integral parts of the health system and that they are contributing to its planning, implementation and review. An experiment on introducing participative style of management in family planning programme, has shown that if the workers are involved in problem identification

and its solution and in fixing the programme targets, they will try to achieve these targets.

Good communication downwards of policies, objectives and strategies needs to be combined with listening to and acting upon ideas and problems collated from below. Formal staff consultations are essential for keeping up the momentum of the health programmes.

5.3.3 *Logistic support.*— Especially in the underserved rural areas, it is essential to improve the communications to extract optimum benefit of the health care even in the remotest areas. The transport facility and availability of drugs and supplies are the most important factors for support of the health programmes.

5.3.4 *Continuing education.*— It should aim at updating of existing skills and also for acquisition of new skills and knowledge. Knowledge and skills acquired during basic training may become obsolete and changing patterns of diseases and of the health delivery systems may make new demands on the health workers.

5.3.4.1 The last decade has seen as immense spurt in continuing education courses in the medical field. With burgeoning of knowledge, it is beyond the reach of a busy professional to keep up with the advances in the field. For the medical practitioners and specialists, a large number of CME programmes have become available.

5.3.4.2 Similarly, for the paraprofessionals also, there should be a well chalked out programme of continuing education for all categories of health professionals by way of refresher courses and in-service training programmes. The employees should be encouraged to attend these courses. Here again in the planning stages, institutions may be identified and asked to provide projects for such programmes.

5.3.4.3 New information be provided to the paraprofessionals through journals, newsletters of relevant councils, associations, national/state libraries, and this aspect should also form an integral part of the planning process.

5.4 Career Development

The essential prerequisite for development of a well considered health paraprofessionals team is to develop a proper cadre taking into consideration the community needs, employment opportunities, promotional career prospects and a well defined career structure.

5.4.1 The important mechanisms of policy planning should be information on present stocks; as well as future projections in relation to need based health care delivery systems. It should be a continuous process of review delineating the ever changing stocks and ever evolving

needs. The policy should also ensure that manpower production is in line with the existing needs, with in-built mechanisms for modifications of number and job objectives of each category, appropriate to such needs.

5.4.2 At present, it has been observed that in most of the categories, there is a swan-neck situation in which there are almost no avenues for further career advancement.

5.4.2.1 A cadre review is absolutely essential to provide for chances of vertical mobility. This could be achieved through in-service training programmes of short and long duration, provision of advanced courses, and possibility of going on study leave for higher courses. In the event of direct entry to professional courses not being possible, there should be bridge courses to prepare the employees for competing more effectively for higher courses. It is also seen that even after acquiring additional competencies through more advanced courses of instruction, the paraprofessionals stagnate at one level. This anomaly should be removed through proper cadre planning and cadre review. There should, also be a provision of study leave after 3-5 years of service for the health professionals to "allow them to pursue advanced courses.

5.5 Health Manpower Information System

For an effective support to the health manpower management, information system is vital for managerial efficiency. The health manpower information should encompass all the components of the health manpower management (Figure). The Committee recommends development of national health manpower information system as an important support to the health manpower development strategies.

5.6 Summary of recommendations

5.6.1 In the initial stages, the Departments of Health and Education, should prepare a plan of action for health manpower management taking into consideration employment, retention, support and development of health care personnel.

5.6.2 Employment procedures should be fairly uniform all over the country and should be clearly delineated. Job descriptions for all categories be prepared, subject to a regular review with continual evolution of the rôle of allied health professionals. Guidelines for recruitment should be uniform but it should be decentralised for proper deployment of the health personnel.

5.6.3 A career structure for all categories should be drawn up and should be continually reviewed keeping in line with emerging and evolving health care strategies and operations.

5.6.3.1 Central guidelines be enunciated for a cadre planning with promotional avenues both for vertical movement and a lateral induction based on seniority and merit. Salary structure should be the same all over the country. In order to remove the spatial distortions between rural and urban health services, incentives must be given by way of allowances, better living and working conditions and other fringe benefits to make the rural service more attractive.

5.6.4.1 Quality of supervision should be optimised and standardised. Clear-cut instructions and guidelines be included in the job descriptions for supervision procedures. In addition to the assessment of skills and performance, the supervisors should also assess the skills acquired during the training courses and any inadequacies be reported to the educational institutions for a further review of curriculum and teaching modalities.

5.6.4.2 Effective communications must exist between all categories of staff and they should be simply involved in planning, implementation and management of the health programmes.

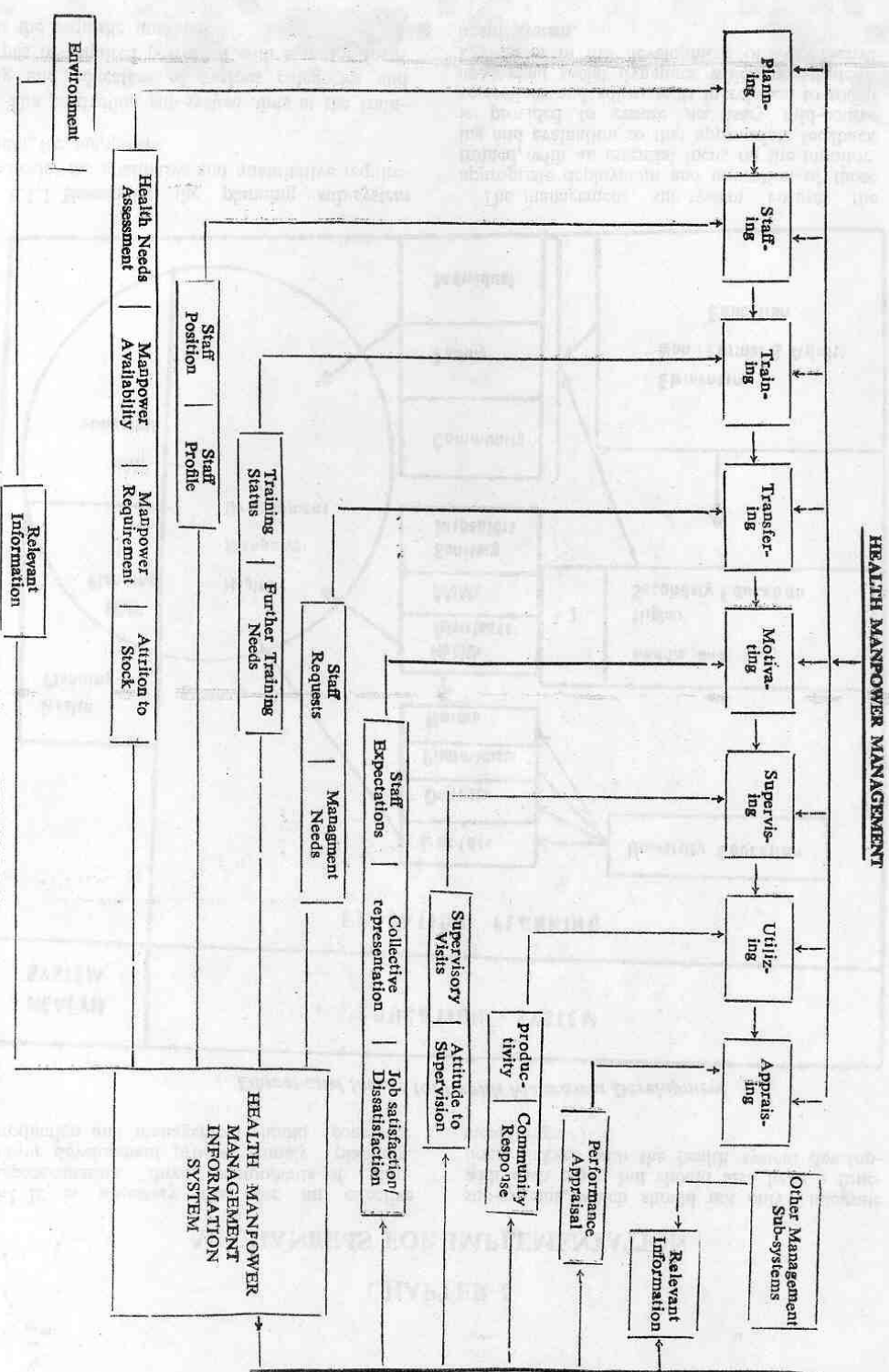
5.6.5.1. Career development and cadre review with focus on promotional avenues through vertical and horizontal mobility should be drawn up.

5.6.5.2 On-the-job training of successful candidates for a period of 3-6 months should precede confirmation in the designated job.

5.6.5.3 Continuing education programmes should be developed with major emphasis on :

- (A) Refresher courses.
- (B) In-service training.
- (C) Bridge courses for advanced professional education.
- (D) Provision of study leave after 3-5 years of service.
- (E) Dissemination of new information.

5.6.6 Mechanism for a national health manpower information system should be developed as an important support to health manpower development and management.



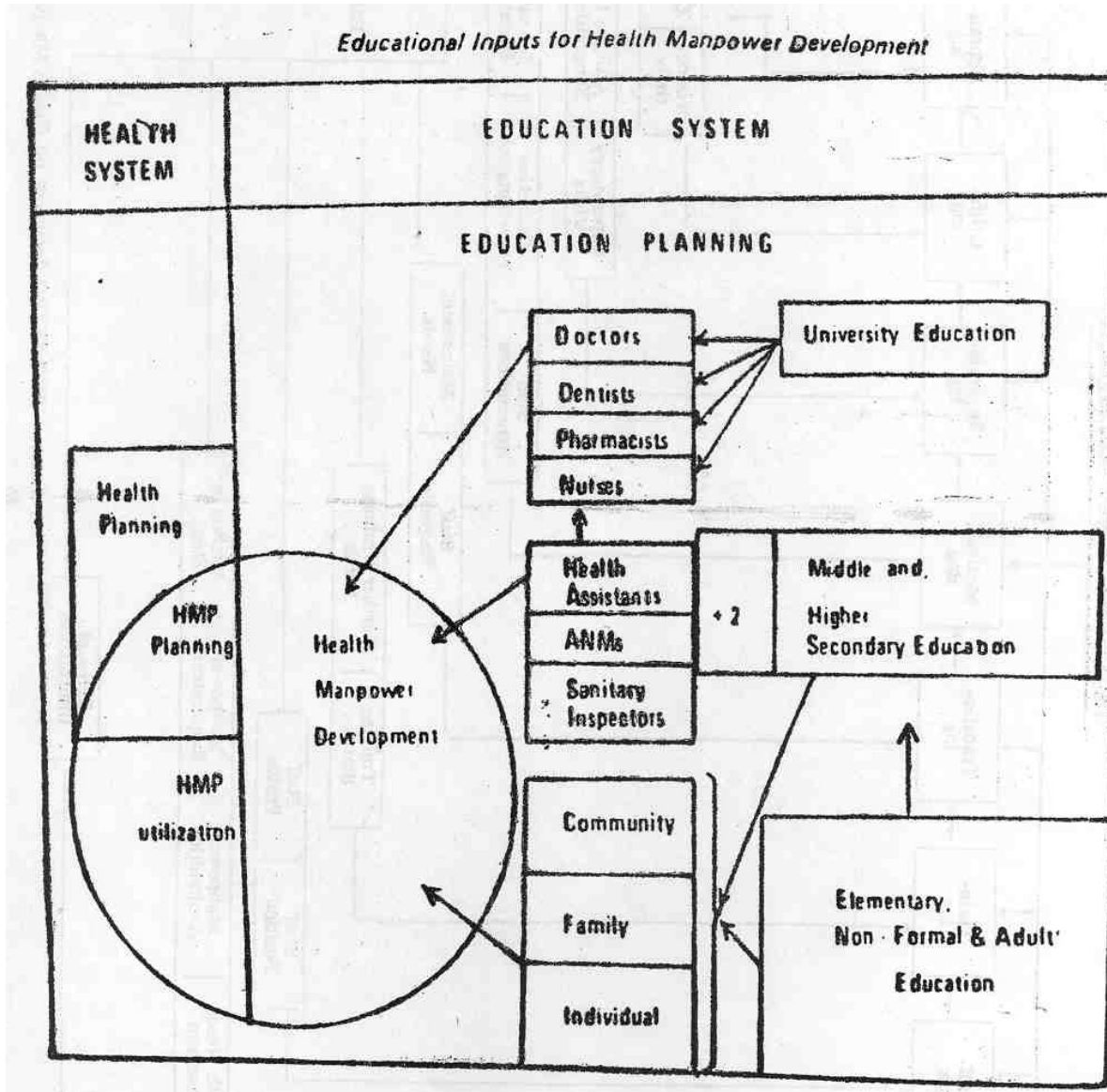
Source:—WHO SEARO document on Health Manpower Management.

CHAPTER 6

MECHANISMS FOR IMPLEMENTATION

6.1 It is necessary that for an effective implementation, three components of manpower development process namely planning, production and management should constitute

sub-systems, which should not only integrate with each other, but should also have a functional linkage with the health system development (Figure).



6.1.1 Essentially the planning sub-system indicates the qualitative and quantitative requirement for manpower.

The production sub-system aims at the training and education of various categories and types of required personnel with a major focus on the requisite numbers.

The management sub-system ensures the appropriate deployment and utilisation of those trained, with an essential focus on the monitoring and evaluation so that appropriate feedback is provided to ensure necessary mid-course corrections and adjustments in relation to social needs and social dynamics which constitute a key factor in the development of an effective health system.

6.1.2 *Health Manpower Surveys.*—The latest attempt at Health manpower assessment in India is available in the report of Medical Education Review Committee 1983. The Committee has reiterated that while some reliable information is available regarding the health manpower in Govt, institutions/health care systems, it is difficult to get a true picture of the paraprofessionals working in private institutions, self employed and those categories who do not have a council, such as Radiographers, Laboratory Technologists, etc.

The assessments and projections have been made in Table 1.

6.1.3 An attempt has been made to project the paraprofessional manpower needs in relation to the primary and intermediate health care services in the Govt, sector (Annexure 3).

6.1.3.1 There are no definite norms available for professional :population ratio or for paraprofessional :professional : population ratio. The most accepted norm is Doctor : population ratio of 1 : 3000 (Bhore Committee), and a Doctor : Nurse ratio of 1:3. Similarly, with regards to Dentists 1 : 3000 population ratio has been suggested.

6.1.3.2 A National Policy on Education in Health Sciences (NPEHS) must be enunciated. The essential components of NPEHS should be entirely consistent with, and subservient to the stated objectives of the National Health Policy, 1983 and the National Policy on Education, 1986. A major focus of NPEHS should be policy guidelines for health manpower development. Indeed, a commitment to this effect has already been made in the National Health Policy and a reference framework has also been defined. (2.2.5)

6.1.4 *Health Manpower Production*

6.1.4.1 The health manpower production, in order to be in tune with the needs of national health service projections, has to have a basic educational infrastructure, especially in the field of paraprofessional training as there are serious shortages of almost all the categories. The facilities of vocational courses will have to be increased in +2 schools and their interlinkages established with the nearest hospitals/institutions. The educational infrastructure has also to take into account available cadre of trained teachers, continuous production of teachers, upgrading of instructional technology and educational software.

6.1.4.2 Job training facilities will have to be developed in relation to the needs of different states and union territories keeping in mind present shortages and future planned projections. Each course of instruction has to be developed in close consultation with the Education and Health departments, on the guidelines developed by a national group of experts, and these should provide standards for the whole country.

6.1.4.3 Although health related vocational courses have been in existence for about a decade, these have not proved popular because of poor linkage between health manpower supply and demand. Furthermore, there is an imperative need of preparing a cadre of teachers of vocational courses, through Teachers Training Centres, at least one in each state. Proper educational technology and software should be developed expeditiously through the help of national institutions like NCERT. Preparation of text-books in English and local languages should be given a top priority. Strengthening of institutions conducting vocational courses and availability of better employment potentials, will attract larger number of candidates.

6.2.1 There is a need for a central organisation in relation to professional education in health related fields. As recommended by the Education Commission, a UGC type of organisation in the field of medical and health education should be constituted. The Committee recommends that such a Commission be called Education Commission for Health Sciences, although alternates such as Health Sciences Commission, or Health Education Commission, or Medical and Health Education Commission may also be considered.

6.2.1.1 The major role of the Commission should be to prescribe standards of education in all branches of health, sciences, including medical sciences at all levels, as also for nursing, pharmaceutical and dental sciences and for other categories of paraprofessionals.

6.2.1.2 The prescriptive and monitoring functions of the educational process in the field of health sciences should be the prime responsibility of the Commission. It should encompass all the Health Sciences Universities in the country, coordinating, monitoring and planning the health manpower production, management and sustenance.

6.2.1.3 It should be primarily responsible for planning the health manpower requirements for the country, taking into consideration the policy of the central and state Governments. The health manpower planning should include both the quantitative requirement of different categories of health related professionals as well as the qualitative categorisation of such professionals in such a way that there should be enough scope of vertical and horizontal mobility within the health care structure. Within this broad policy framework, a large number of functional components of the proposed Commission can be defined and enunciated as follows :

- (1) To provide realistic projections for national health manpower requirements and to recommend the establishment of mechanism(s) through which such projections could be continuously reviewed in context of evolving socio-epidemiological needs and demographic requirements.

- (2) To initiate action for the creation of educational institutions and facilities, or strengthening of such facilities in already existing educational institutions, that would facilitate the production of projected health manpower, and to consider the establishment of one or more Universities of Health Sciences.
- (3) To implement desired changes required to be brought about in the curricular contents and training programmes of health personnel and allied health professionals, at various levels of functioning.
- (4) To plan and implement appropriate changes in the educational system that would facilitate the establishment of essential inter-linkages between health functionaries of various grades.
- (5) To establish a continuing review mechanism for the strengthening of health-related pedagogic and communication technologies, and to recommend the development of such health-related community educational programmes that could effectively and optimally utilise these technologies.
- (6) To develop in-built mechanisms of review, monitoring, and mid-course corrections so as to ensure expeditious implementation of recommendations and decisions.
- (7) To coordinate intersectoral research by interlinking the education and training of suitable manpower with mission oriented research needs.

6.2.1.4 It should also be seriously considered whether the proposed commission should be concerned with education and training in other systems of medicine, including Ayurveda, Unani and Homoeopathy. If such a responsibility is allocated to the Commission, it may provide the nucleus for the development in future of a National System of Medicine related to a unified national policy. The risk of such an approach may be that the essential focus for the commission may not remain as sharp. In addition, it may be subjected to different pressures and pulls which may not always be based on scientific or ethical consideration. The Committee would, therefore, recommend consideration of education and training of practitioners of Homoeopathy and Indian Systems of Medicine by the Commission as a first step towards harnessing this important health manpower resource for attainment of objectives of national health policy.

6.2.1.5 Professional Councils

6.2.1.5.1 There are several professional statutory councils namely the Medical Council of India, the Nursing Council of India, the

Dental Council of India, the Pharmacy Council of India, the Homoeopathy Council and Council for Indian System of Medicine. Each council functions independently and often there is no awareness of a collective responsibility towards the fulfillment of national needs and objectives.

6.2.1.5.2 No conflict is envisaged between the existing professional councils and the proposed Education Commission for Health Sciences. Indeed, the professional councils can constitute advisory panels which may fulfill the role and function of small task forces for the proposed commission.

It is firmly believed that the establishment of the Education Commission for Health Sciences on the lines of UGC will be a major step to initiate efforts towards integration of educational inputs and health requirements, both interdigitating to strengthen and reinforce development of human resources.

6.2.1.5.3 The main role of the existing professional councils should be to deal with matters of registration, as well as regulation and monitoring of professional ethics and professional conduct. However, as these councils are also expected to prescribe standards of professional education, the other functions have not received the attention and consideration that they deserve. It would be most appropriate if the existing professional councils should concentrate on :—

- (a) Recognition or de-recognition of degrees or diplomas granted by Universities or Institutions.
- (b) Development of interlinkages and reciprocities with corresponding councils in other countries.
- (c) Registration of qualified professionals and maintenance of an all India register.
- (d) Inspection and certification of standards of examinations and available facilities for education and training.
- (e) Monitoring of professional ethics, and
- (f) Regulation and surveillance of professionals' conduct.

6.2.2 *Universities of Health Sciences.*—As there is a strong justification for the creation of an Education Commission for Health Sciences based on a cogent argument that there should be a unitary organisation to prescribe and monitor the standards of training of all constituent health manpower involved in the delivery of health care as a team, for the same reason there should also be a physical environment where all such faculties can interact together to provide model experience for the future functioning of such health care teams. This can be only made possible by the creation of Universities of Health Sciences.

6.2.2.1 At present, the education and training of different health professionals is the impossibility of individual institutions. Besides medical colleges, dental colleges and nursing colleges, there are a variety of other institutions involved in the training of several categories of health manpower including pharmacists, health assistants, ANMs, laboratory technicians, radiographers, physiotherapists, health educators, etc. There is hardly any coordination between the training programmes being conducted in different institutions. Indeed, till today, most of these institutions have not even prepared the educational objectives for the courses of instruction that are being conducted. There is hardly an awareness of educational technology that may be useful in medical and health sciences. It is obvious that the establishment of a University of Health Sciences will create bridges for close interactions between these faculties. More importantly, the educational objectives of the faculties and individual training programmes shall be so coordinated as to make the realisation of ultimate goal, health for the people, not only possible but achievable.

6.2.2.2 It is entirely likely that several new faculties will grow in the University of Health Sciences: faculties such as those of health management, health economics, social and behavioural sciences and nutrition are needed even today. It is only through the cross fertilisation of ideas that additional momentum can be generated to strengthen the delivery of health services. Finally, development of educational programmes for community health as can be used in the mass media system (for example TNSAT-1B) can be achieved through a multi-disciplinary activity of several faculties combined together under the University of Health Sciences. It is obvious that within the conceptual structure outlined and proposed, the University of Health Sciences shall function as a federal university with provision for affiliation of colleges as well as for the development of independent faculties. It is expected that a faculty of health information systems is also established in the Health Science Universities. Andhra Pradesh has already established a Health Sciences University on 2nd November 1986.

6.2.2.3 The Health Science University is the implementing arm for the policy and guidelines enunciated by the Education Commission of Health Sciences and will work in close coordination with each other.

6.2.2.4 One University of Health Sciences be established in each state. All the medical colleges, dental colleges, nursing colleges and para-professional colleges imparting graduate level education be affiliated. University of Health Sciences will implement all the policies and guidelines enunciated by the Education Commission of Health Sciences for health manpower development. University of Health

Sciences will also coordinate with the state branches of professional and para-professional councils. However, till such time that a University of Health Sciences can be established in each state and Union Territory, a beginning may be made in the Eighth Plan to establish such universities on a regional basis.

6.2.3 *Health Manpower Cells.*—The health manpower planning should be carried out at the central level with the collaboration of Education Ministry, Health Ministry and Education Commission of Health Sciences under the overall purview of the proposed apex body (Central Council of Technical and Higher Education), and in pursuance of National Policy of Education in Health Sciences. It is essential to have cells in the Directorate General of Health Services and State Directorates of Health to monitor the implementation of the policies and guidelines emerging from the central authorities. The Health manpower cells may also interact with the corresponding faculties in the Universities of Health Sciences, as well as with the Education Commission of Health Sciences.

6.3 The plans for health manpower production should be closely monitored and evaluated at least once in two years by the Central authorities. Such an ongoing review shall provide the much needed in-built mechanism for reorganisation at any point of time.

6.4 Summary of Recommendations

6.4.1 A National Policy on Education in Health Sciences (NPEHS) must be enunciated. The essential components of NPEHS should be entirely consistent with, and subservient to the stated objectives of the National Health Policy, 1983 and the National Policy on Education, 1986. A major focus of NPEHS should be policy guidelines for health manpower development. Indeed, a commitment to this effect has already been made in the National Health Policy and a reference framework has also been defined. (2.2.5)

6.4.2 A realistic health manpower survey should be carried out.

6.4.3 In order to launch an effective vocationalisation, the educational infrastructure should also take into account availability of teachers training courses, continuous production of teachers, upgrading of instructional technology and educational software. National institutes such as NCERT may be requested to develop educational technology and softwares including text-books for each course in English as well as in local languages.

6.4.4 Education Commission for Health Sciences should be established as a central organisation in the field of professional education in health related fields. It should be constituted on the lines of UGC.

6.4.4.1 The operational framework of the Commission should include :—

- (1) To provide realistic projections for national health manpower requirements and to recommend the establishment of mechanism (s) through which such projections could be continuously reviewed in context of evolving socio-epidemiological needs and demographic requirements.
- (2) To initiate action for the creation of educational institutions and facilities, or strengthening of such facilities in already existing educational institutions, that would "facilitate the production of projected health manpower, and to consider the establishment of one or more Universities of Health Sciences.
- (3) To implement desired changes required to be brought about in the curricular contents and training programmes of health personnel and allied health professionals, at various levels of functioning.
- (4) To plan and implement appropriate changes in the educational system that would facilitate the establishment of essential interlinkages between health functionaries of various grades.
- (5) To establish a continuing review mechanism for the strengthening of health-related pedagogic and communication technologies, and to recommend the development of such health-related community educational programmes that could effectively and optimally utilise these technologies.
- (6) To develop in-built mechanisms of review, monitoring, and mid-course corrections so as to ensure expeditious implementation of recommendations and decisions.
- (7) To coordinate intersectoral research by interlinking the education and training of suitable manpower with mission oriented research needs.

6.4.4.2 Education Commission for Health Sciences should liaise with all existing professional councils and recommend, if necessary

establishment of councils for other categories of health professionals, in case such councils are considered essential as a support mechanism for the Commission.

6.4.4.2.1 The professional councils should concentrate on :—

- (a) Recognition or derecognition of degrees or diplomas granted by Universities or Institutions.
- (b) Development of interlinkages and reciprocities with corresponding councils in other countries.
- (c) Registration of qualified professionals and maintenance of an all India register.
- (d) Inspection and certification of standards of examinations and available facilities for education and training.
- (e) Monitoring of professional ethics, and
- (f) Regulation and surveillance of professionals' conduct.

6.4.5 Health Sciences Universities be established in each State and in groups of Union Territories as the implementing arm of E.C.H.S. for production, evaluation and sustenance of health manpower policy. However, till such time that a University of Health Sciences can be established in each state and Union Territory a beginning may be made in the Eighth Plan to establish such Universities on a regional basis.

6.4.5.1 Health Sciences Universities (HSU) should affiliate all medical and related colleges and award degrees in these fields.

6.4.5.2 Cognisant of the fact that the scope of medical and health education has evolved considerably in the recent years, newer faculties ; should develop such as health management, health economics, social and behavioural sciences, educational reprographics and health \ information systems.

6.4.6 To coordinate the implementation of health manpower policy at the centre and the states, Health Manpower Cells may be created at the centre and in the states.

CHAPTER 7

RECOMMENDATIONS

1. It is necessary to formulate a National Policy on Education in Health Sciences (Medical and Health Education Policy) which—(i) sets out the changes required to be brought about in the curricular contents and training programmes of medical and health personnel, at various levels of functioning, (ii) takes into account the need for establishing the extremely essential interrelations between functionaries of various grades, (iii) provides guidelines for the production of health personnel on the basis of realistically assessed manpower requirements, (iv) seeks to resolve the existing sharp regional imbalances in their availability, and (v) attempts to ensure that personnel of all levels are socially motivated towards the rendering of community health services. (2.2.5).

2. The Committee is of the firm view that social, moral, health and physical education should constitute a holistic approach. The curricular contents of courses of instruction for school teachers, and more particularly physical education instructors, should include these components so that the rationale of such an approach is imbibed during the period of training. (2.4.4).

3. Seventh Plan formulations of integrated planning and coordinative implementation on decentralized and participative basis may be initiated in areas of health and education. Integrated Area Development Model with suitable changes and modifications may be considered for the purpose. (2.5.4.1).

4. Active participation of the community, a commonly accepted intervention strategy both by Health and Educational policies, should be strengthened through the village committees, learner groups and proposed centres for continuing education in rural areas and District Boards of Education, as envisaged in the National Education Policy. (2.5.4.2).

5. District Institutes of Education and Training, and Training Schools/Institutes in Health Sector should "develop integrated Training modules for various categories of allied health professionals including community level workers in both the sectors and organise orientation programmes accordingly. (2.5.4.3).

6. Voluntary Organisations are playing a vital role in the processes of implementation of national objectives in Health and Education.

Strengthening of this mode of delivery mechanism is emphasised by both the Policy documents. It is recommended that a coordinative machinery be set up at the national level, to devise methods and procedures for generation and development of holistic programmes with active involvement and participation by voluntary organisations, and more importantly with appropriate financial allocations. (2.5.4.4).

7. One of the major tasks before the Committee was related to estimation of para-medical and auxiliary manpower at the primary and intermediate level of care. Fully operational community health centres, once developed and well organised, perhaps provide equal level of secondary care as is available from present district hospital; such level may, therefore, be defined as intermediate level of care. (3.2.6).

8. Health service statistics need to be improved in quality, functioning of registering bodies for health professionals needs to be improved and health manpower studies need to be mounted. The existing situation regarding health manpower supply, demand and projections is unlikely to improve significantly, until and unless definite mechanisms in terms of creation of organisational structures responsible for health manpower development are brought into existence. (3.4.1) (3.4.2).

9. The areas where the practitioners of Homoeopathy and Indian Systems of Medicine can be gainfully utilised are the areas of National Health Programmes like the National Malaria Eradication Programme, National Leprosy Eradication Programme, Blindness Control Programme, Family Welfare and MCH Programme, particularly the programme of universal immunisation and nutrition, to ensure that such practitioners will be used in judicious manner it will be extremely essential to strengthen their basic training by incorporating appropriate educational components which will enable them to support the above National Health Programmes. (3.5.5).-

10. The health manpower requirements for primary health care must take cognisance of the fact that individuals, families and the community constitute a most important health manpower resource. Educational process at all levels must aim at the incorporation of such learning experiences that may lead to desired change(s) in the health behaviour. (4.2) (4.2.1).

11. Incorporation of meaningful learning experiences related to health component in universal education can, therefore, reach quickly and effectively to a large mass of population, constituting a major means of health education to the community. (4.2.8).

12. Action strategies need to be evolved to make health education more pervasive, with potential of making a discernible impact on health-related behaviour of individuals, families and communities. The possible areas of intervention include review and restructuring of curriculum so as to build demonstrable action points as key learning experiences.

The socially useful productive work (SUPW) experience needs to be redesigned so as to effectively demonstrate interdependence of literacy, social and family welfare, and health.

Health component, with well structured pedagogic inputs, needs to be incorporated in the teacher training and education curriculum.

There is a paucity of educational software of health which could be effectively used in the mass media technology. A coordinated effort by several agencies in different sectors along with that of voluntary professional organisations working in health and education, needs to be initiated to meet such software demands for community health education. (4.2.9).

13. The present practice or methods of implementing the health component in all educational processes leave much to be desired. The situation is due to lack of proper orientation, skills and attitudes towards these themes among instructors and teachers. It would be necessary to strengthen the health related education component, at all levels especially in grades IX and X. Such strengthening would call for emphasis and change in methodology of instruction of these themes with a view to adding demonstrable learning experiences, rather than inclusion of some more topics for didactic exercise. Suitably modified, these courses should lay strong foundations for vocational courses on health at +2 stage. (4.3.2).

14. The Committee strongly recommends health-related vocational courses for the following categories of health manpower :

- (i) Auxiliary Nurse Mid-wife (ANM)/ Multi-Purpose Health Worker, Female.
- (ii) Multi-Purpose Health. Worker, Male.
- (iii) Radiographers/X-ray technicians.
- (iv) Laboratory technicians (for clinical, public health, Food and Drug Laboratory).
- (v) Ophthalmic Assistants/Refractionists.
- (vi) Dental Hygienists.
- (vii) Pharmacists.
- (viii) Hospital House Keepers.
- (ix) Occupational Therapists/ Physio-Therapists.
- (x) Sanitary/Health Inspectors. (4.6.1).

15. The Committee is of the considered opinion that an in-depth review of education and training facilities for the above categories of personnel should be undertaken.

At present, the training of several categories of such workers is being undertaken in some Higher Secondary Schools, particularly in the States of Karnataka, Andhra Pradesh and Maharashtra as a part of vocationalisation organised by the education department. But in most of the cases and in most of the States, the training of these professionals is being conducted in schools/institutions especially designed for them or in association with existing institutions, mostly medical colleges/institutions, through health department. It is, therefore, mandatory that appropriate linkages and coordination must be developed between the health and education departments in every State, with establishment of Coordination Committees at district level. (4.6.2).

16. The Committee recommends that the courses of instruction presently being organised by the health department should be reorganised so as to be equated with the 10+2 system. To do so, a curricular mix will have to be evolved wherein languages and related subjects including science, mathematics and humanities, etc. etc. shall constitute about 25-30% of the total period of instruction, while vocational theory and practice, including on-the-job training will occupy the remaining 70-75% of the total allocated time. While the facilities available in the higher secondary schools can be provided for the courses of instruction in science, mathematics, humanities and languages, the infrastructure available at the schools of training for allied health professionals like ANMs may be used for imparting the vocational component of the health-related courses. The Committee recommends that a small sub-committee be appointed to work out a detailed plan of action. While the Committee would wish to emphasise maximal utilisation of existing facilities irrespective of the sectoral denomination, a provision must also be made for ensuring adequate financial outlays to generate requisite infrastructure both in material and manpower resources. (4.6.3).

17. It is recommended that the entry point for all the courses should be after the stage of 10th standard. The +2 stage of two years can conveniently be broken into 4 semesters in which general educational and vocational courses of instructions can be imparted to the para-professionals indicated above. The Group recommends that the first year of the 10 + 2 system, that is, the first two semesters should be for a common core curriculum for all types of para-professional workers. During the third semester, specialised areas should be included in the training of specific categories of personnel whereas the 4th semester should be for practical training and work experience in the chosen area of para-professional

vocationalisation. Several temporal alignments are possible to achieve such modular organisations. (4.6.4).

18. It is recommended that for these coordinated/integrated training courses, the faculty from the disciplines of Biology, Physics, Chemistry be drawn from the existing secondary schools. These schools can also provide faculty support for instruction in languages and humanities, whereas the instruction in health sciences could be easily imparted by part-time faculty members drawn from the existing district hospitals, training schools and institutions, medical colleges, etc. wherever available and even from retired health scientists. Transfer of credits on the basis of common modules of instruction at the +2 vocational level needs to be ensured on a uniform basis so as to be widely applicable throughout the country. (4.6.5).

19. In view of the curricula! mix of language and humanities courses as a part or + 2 vocational education, the students should be able to pursue higher courses of training in medical and other professional colleges and universities, either at the end of +2 stage or after 3-5 years of work experience in the chosen vocation. This would provide incentive for joining health-related vocational courses at +2 stage. (4.6.6).

20. It is recommended that the Government may consider award of stipends/scholarships to students pursuing health vocational courses. Such awards should be based on merit-cum-means, and would further add to the incentives for such courses.

In order to facilitate employment of those qualifying health-related vocational courses, the Committee strongly recommends that the State Governments should initiate steps to secure recognition from the employment sector for these courses. Departments of Health, following appropriate assessment, should take a lead in according such recognition. (4.6.7).

21. As the teachers- of vocational course are drawn from two distinct categories of discipline i.e. general and medical education, there should be a shared awareness and concern for the educational requirement of the students. The part-time staff of even highly qualified professional people as well as whole time teachers would require appropriate orientation in instructional techniques and evaluation methodology. To keep full-time teachers abreast of the latest practices, periodical refresher training will have to be conducted. (4.6.8).

22. The teachers should be made aware that para-medical vocational education should not only _ focus attention to *train* the students for acquisition of skills, attitudes, understanding and knowledge relating to specific para-medical vocation, but should also aim to *educate* them in a manner that it should lead to :

- (a) an understanding of the emerging trends in the field of health at the national and international level;

- (b) the comprehension of the social, political and environmental implication of scientific and technological change;
- (c) the establishment of a new relationship between education, working life and the community as a whole; and
- (d) the appreciation of vocational education as a part of system of life-long education adapted to the needs of one's own society. (4.6.9).

23. Most important, the teachers should bear in mind that the vocation should not lead to the *cul-de-sac* of a mechanical life but should aim for a life of mission as well as of personal growth. A proper appreciation of the vocational course as well as teaching of non vocational component so as to make it relevant to the chosen vocation, requires that the concerned teachers of general education also need appropriate training aimed at generating awareness of job opportunities and task requirements of the vocation, and of the general outline of the content of vocational component. (4.6.10).

24. For effective educational planning of para-medical vocational courses, there is need for proper assessment of District-wise, State-wise, and Nation-wise para-medical vocational manpower requirement. The choice of vocation for manpower production at District level or State level should not, however, be based on need assessment alone, but also on regional employment capabilities of the employing agencies at .District and State level, both in the public and private sector, self-employment possibilities, prior recognition of the courses by competent authority, and establishment of proper linkage between technical collaborating and educational institutions. The Committee would wish to endorse the recommendation of the National Working Group on Vocationalization , of Education regarding establishment of a National/Joint Council for Vocational Education and State Councils of Vocational Education, and would recommend an effective inter- , linkage of such councils with the proposed Education Commission of Health Sciences and Regional or State Universities of Health Sciences. (4.6.11).

25. A vocational curriculum, to be need-based, must be developed through proper identification of minimum vocational competencies required in the job market by experts through systematic analysis of manpower (Supply, demands and projections; tasks and duties demanded in those jobs; and the requisite skills for various tasks/duties to be performed. (4.6.12).

- (1) "Minimum competencies based curriculum" will not only act as a corrective measure by way of helping in the process of revision of curricula already in operation in the States presently implementing vocationalisation but: it can also accelerate the process of introduction of

such courses in other States which are going to launch the programme, by providing readymade material. (4.6.12.1).

(2) Guidelines need to be prepared so as to

provide necessary information on various aspects of programme implementation; reference materials; selection of teachers; training facilities; learning aids and settings etc. These will be of considerable use to curriculum planners, authors of instructional materials, supervisors, teachers, students and employers. (4.6.12.2).

(3) The curriculum should be flexible enough to provide local variation for adaptation related to specific needs. (4.6.12.3).

(4) If the same team which is responsible for planning the curriculum can develop the guidelines as well as instructional materials (text-cum-practical manuals, supplementary readers, self-learning materials), not only the continuity of educational process is maintained, but much time would be saved in the final dissemination of such materials. A major effort also needs to be initiated to develop instructional materials in regional languages^ (4.6.12.4).

26. There is great variation in between different States, in the pattern of "vocational courses and the credits accorded to different components. Consequently, the products supplied by different States differ so far as attainment of skills are concerned. For the establishment of a national standard of health services, it is desirable to ensure the development of a national norm of standards for each vocation. (4.6.13).

27. Maintenance of standards of such a vital segment as allied health professionals is, therefore, very necessary. Proper evaluation measures during, and following the completion of courses of instruction, can not only ensure standardization of educational process but also of the quality of the product, thus leading to appropriate recognition by public and private sector, and regional and central employing health institutions. Exercise of 'quality' control of the process of education, as also of its product, indirectly helps in the elimination of non-standardised products, of unauthorized institutions, thus preventing a backdoor entry into health services, and jeopardizing establishment of health service standards in the country. (4.6.14).

(1) In a vocational area, achievement of goals in the cognitive domain is as important as that in the psycho-motor domain, because an allied health professional has to demonstrate a homogenous blend of knowledge, skills and behavioural attitudes. As there is an intimate interaction with suffering human-

beings, such a para-professional is expected to serve as a bridge between common man and professional expert; thus, attainments in the effective domain also assume significance. It is, therefore, necessary that evaluation of paramedical personnel, both formative and summative, must be comprehensive so as to test his vocational competencies of knowledge and comprehension, phycho-motor skills and attitudes, with balanced assignments of credits. (4.6.14.1).

(2) To evaluate the attainment of competencies in these three domains, a comprehensive framework of evaluation with appropriate tools and techniques for each vocation, need to be developed. (4.6.14.2).

(3) Evaluation of psychomotor skills and personality traits ^attitudes) in general education, and much more so in vocational education, has not attracted as much attention of the evaluators as in the case of written examination which primarily aims at the assessment of cognitive domain. It is, therefore, time that serious thought is given to this vital aspect of evaluation which constitutes the very essence and foundation of health services. (4.6.14.3).

(4) To streamline process of evaluation and make it meaningful and effective, a Committee for each health-related vocational course, consisting of specialists, professionals, teachers, evaluators and evaluation experts should be constituted. This Committee should specifically focus on:

- Development of guidelines, framework, methods, tools and techniques of evaluation; and
- Testing, validation, refinement and updating of the above. (4.6.14.4).

28. An all encompassing plan should be drawn up intersectorally for health manpower production, apioymeni. and sustenance. Three tier inter-linkages are suggested—

(a) *Central level.*—the Ministries of Health and Education should evolve a strategy of the extent of vocational education, draw up essentials of a core curriculum valid for the whole country, decide employ trainers, preparation of teaching materials, identify course objectives and contents.

(b) *State level.*—Jointly, the Health and Education departments should follow the guidelines provided by the centre, identify the need of various categories in the state, allocating various categories to +2 schools and identifying the collaborating hospitals/institutions, providing training of teachers of the vocational courses and develop local need based in-

structional materials. They should make budgetary provisions for the educational process and professional content as well as for absorption of successful candidates. Evaluation/examining bodies need to be constituted.

- (c) *Local institutional level.*—The school authorities must interact with the hospital/institutional authorities for efficient coordination and conduct of the course of instruction with built-in mechanism of close monitoring and evaluation mechanisms. (4.6.15.1).
- 29. In the initial stages, the Departments of Health and Education should prepare a plan of action for health manpower management taking into consideration employment, retention, support and development of health care personnel. (5.6.1).
- 30. Employment procedures should be fairly uniform all over the country and should be clearly delineated. Job descriptions for all categories be prepared, subject to a regular review with continual evolution of the role of allied health professionals. Guidelines for recruitment should be uniform but it should be decentralised for proper deployment of the health personnel. (5.6.2).
- 31. A career structure for all categories should be drawn up and should be continually reviewed keeping in line with emerging and evolving health care strategies and operation. (5.6.3):

Central guidelines be enunciated for a cadre planning with promotional avenues both for vertical movement and a lateral induction based on seniority and merit. Salary structure should be the same all over the country. In order to remove the spatial distortions between rural and urban health services, incentives must be given by way of allowances, better living and working conditions and other fringe benefits to make the rural service more attractive. (5.6.3.1).
- 32. Quality of supervision should be optimised and standardised. Clear-cut instructions and guidelines be included in the job descriptions for supervision procedures. In addition to the assessment of skills and performance, the supervisors should also assess the skills acquired during the training courses and any inadequacies be reported to the educational institutions for a further review of curriculum and teaching modalities. (5.6.4.1).
- 33. Effective communication must exist between all categories of staff and they should be jointly involved⁴ in planning, implementation and management of the health programmes. (5.6.4.2).
- 34. Career development and cadre review with focus on promotional avenues, vertical and

horizontal mobility should be drawn up. (5.6.5.1).

35. On-the-job training of successful candidates for a period of 3-6 months should precede confirmation in the designated job. (5.6.5.2).

36. Continuing education programmes should be developed with major emphasis on:

- (a). Refresher courses.
- (b). In-service training.
- (c). Bridge courses for advanced professional education.
- (d). Provision of study leave after 3-5 years of service.
- (e). Dissemination of new information. (5.6.5.3).

37. Mechanism for a national health manpower information system should be developed as an important support to health manpower development and management. (5.6.6).

38. A National Policy on Education in Health Sciences (NPEHS) must be enunciated. The essential components of NPEHS should be entirely consistent with, and subservient to the stated objectives of the National Health Policy, 1983 and the National Policy on Education, 1986. A major focus of NPEHS should be policy guidelines for health manpower development. Indeed, a commitment to this effect has already been made in the National Health Policy and a reference framework has also been defined. (6.4.1).

39. A realistic health manpower survey should be carried out. (6.4.2).

40. In order to launch an effective vocationalisation, the educational infrastructure should also take into account availability of teachers training courses, continuous production of teachers, upgrading of instructional technology and educational software. National institutes such as NCERT may be requested to develop educational technology and softwares including textbooks for each course in English as well as in local languages. (6.4.3).

41. Education Commission for Health Sciences should be established as a central organisation in the field of professional education in health related fields. It should be constituted on the lines of UGC. (6.4.4).

The operational framework of the Commission should include :—

- (1) To provide realistic projections for national health man-power requirements and to recommend the establishment of mechanism(s) through which such projections could be continuously reviewed in context of evolving socio-epidemiological needs and demographic requirements.

To initiate action for the creation of educational institutions and facilities, or strengthening of such facilities in already existing educational institutions, that would facilitate the production of projected health manpower, and to consider the establishment of one or more Universities of Health Sciences.

- (2) To implement desired changes required to be brought about in the curricular contents and training programmes of health personnel and allied health professionals, at various levels of functioning.
- (3) To plan and implement appropriate changes in the educational system that would facilitate the establishment of essential inter-linkages between health functionaries of various grades.
- (4) To establish a continuing review mechanism for the strengthening of health-related pedagogic and communication technologies, and to recommend the development of such health-related community educational programmes that could effectively and optimally utilise these technologies.
- (5) To develop in-built mechanisms of review, monitoring, and mid-course corrections so as to ensure expeditious implementation of recommendations and decisions.
- (6) To coordinate intersectoral research by interlinking the education and training of suitable manpower with mission oriented research needs. (6.4.4.1).

42. Education Commission for Health Sciences should liaise with all existing professional councils and recommend, if necessary, councils, for health professional categories, if these do not exist. (6.4.4.2).

43. The main role of the existing professional councils should be to deal with matters of registration, as well as regulation and monitoring of professional ethics and professional conduct. However, as these councils are also expected to prescribe standards of professional education, the other functions have not received the attention and consideration that they deserve. It would be most appropriate if the existing professional councils should concentrate on :—

- (a) Recognition or derecognition of degrees or diplomas granted by Universities or Institutions.
- (b) Development of interlinkages and reciprocities with corresponding councils in other countries.

- (c) Registration of qualified professionals and maintenance of an all India register.
- (e) Inspection and certification of standards of examinations and available facilities 'for education and training.
- (e) Monitoring of professional ethics, and
- (f) Regulation and surveillance of professionals' conduct. (6.4.4.2.1).

44. Health Sciences Universities be established in each State and in groups of Union Territories as the implementing arm of E.C.H.S. for production, evaluation and sustenance of health manpower policy. However, till such time that a University of Health Sciences can be established in each State and Union Territory, a beginning may be made in the Eighth Plan to establish such Universities on a regional basis. (6.4.5).

45. Health Sciences Universities (HSU) should affiliate all medical and related colleges and award degrees in these fields. (6.4.5.1).

46. Cognisant of the fact that the scope of medical and health education has evolved considerably in the recent years, newer faculties should develop such as health management, health economics, social and behavioural sciences, educational reprographics and health information systems. (6.4.5.2).

47. To coordinate the implementation of health manpower policy at the centre and the states. Health Manpower Cells may be created at the centre and in the states (6.4.6).

48. The Committee wishes to recommend that there is an urgent need to revamp and strengthen the primary health care in the urban areas to provide the preventive and promotive services in a comprehensive manner. (3.6.5.1).

49. There should be a major emphasis on the creation and establishment of necessary infrastructure including beds to strengthen linkages between already established primary health care system in the rural areas and the required linkages and referrals to the intermediate health care stations. (3.6.5.2).

50. The Committee wishes to reiterate that the distortions in health man-power production and utilisation need to be remedied in as short time as possible. To do so would not only require political will and commitment but should also be reflected in the future allocations of financial resources both in areas of strengthening the primary health care facilities as well as for generating adequate employment potential.

A ANNEXURES

ANNEXURE 1

No. U. 11020/2/86-MEP

Government of India

Ministry of Health & Family Welfare

Dated the 8th May, 1986

Resolution

The Government have laid down a National Health Policy and accepted health for all by 2000 AD as the basic objective of the policy. The implementation of the policy would require the development of a suitable infrastructure. Medical and Para-Medical Man-power requirements will have to be assessed and preparatory action taken to train the required Man-power. It has been emphasised that a man-power programme would have to be drawn up carefully keeping in view the availability of jobs and the capacity to absorb the trained manpower in future years. This aspect may also be interlinked with the provision of adequate financial allocation for the Health Sector to create the necessary jobs.

2. It has therefore, been decided that a Committee of Experts might be constituted by the Ministry of Health and Family Welfare to determine the manpower requirements in the medical and allied health related areas, and to make definite recommendations regarding the creation of additional vocational training facilities.

3. The composition of the Committee is as under:

- | | |
|--|-----------------|
| 1. Prof. J. S. Bajaj,
Prof. of Medicine,
AIIMS, New Delhi. | <i>Chairman</i> |
| 2. Dr. Harcharan Singh,
Joint Adviser,
Planning Commission. | <i>Member</i> |
| 3. Shri Satya Bhushan
Director, National Institute of
Educational Planning &
Administration or his nominee. | <i>Member</i> |
| 4. Dr. J. P. Gupta,
Joint Director,
National Institute of Health and
Family Welfare. | <i>Member</i> |
| 5. Shri A. M. Nimbalkar.
Director of Employment and Training..
Ministry of Labour
or his nominee. | <i>Member</i> |
| 6. Mrs. B. K. Karthayani,
D-4, Kaveri Apartments,
Alaknanda Colony,
New Delhi. | <i>Member</i> |

7. Dr. K.B.Shai'ma, *Member-Secy.*
Deputy Director General of
Health Services,
Directorate General of Health
Services, New Delhi.

4. The terms of reference of the Committee shall be as under :

- (1) To provide an assessment of existing and projected national health manpower requirements for the primary and intermediate level health care programmes, and to recommend the establishment of mechanism(s) through which such projections could be continuously reviewed in the context of evolving socio-epidemiological needs and demographic requirements.
- (2) To recommend the type of health-related courses of instruction that should be incorporated at the 4-2 stage for vocational education and to recommend appropriate educational content at the pre-vocational level which would stimulate and encourage the students to enter health related vocational courses.
- (3) To recommend the essential educational infrastructure including establishment of educational institutions and facilities or strengthening of such facilities in already existing educational institutions that would facilitate the production of appropriate categories of health manpower.
- (4) To recommend such modifications in the education and health systems that would facilitate the establishment of essential interlinkages between health manpower production, deployment and utilisation.
- (5) To make recommendations that would safeguard the career prospects of various categories of health manpower at the primary and intermediate level, through the development of bridge courses for horizontal mobility and vertical progress.
- (6) To recommend the establishment of mechanisms or agencies so as to ensure an expeditious development of educational objectives, curricular contents and learning settings for the course of instruction recommended by the Committee.

5. The Committee will also take into consideration the reports of the Expert Committees already available on manpower projection and

the present supply of vocational, technical and professional manpower in the medical and allied health related areas.

(6) The Committee may also consider and make its recommendations in regard to any other related matter.

(7) The Committee will submit its report within two months or earlier.

(8) The expenditure on TA/DA of official members will be met from the same source from which their pay and allowances are drawn. The expenditure on TA/DA of non-official members will be met from the Sub-Head A. 1-Sectt. A. 1(1)—Deptt. of Health A. 1(1)(3) Travel Expenses under Major Head 276 in Demand No. 44 Ministry of Health and Family Welfare for the year 1986-87.

Sd/-

(P. K. UMASHANKAR)

*Additional Secretary to the
Govt, of India.*

ADDRESSES

1. Prof. J. S. Bajaj,
Professor of Medicine,
All India Institute of Medical Sciences,
Ansari Nagar,
NEW DELHI-110 029.
2. Dr. Harcharan Singh, Joint Adviser,
Planning Commission, Yojna Bhavan,
Parliament Street, New; Delhi,
3. Prof. Satya Bhushan,
Director,
National Institute of Educational
Planning and Administration, New Delhi.
4. Dr. J. P. Gupta,
Joint Director,
National Institute of Health and Family
Welfare,
Now Mehrauli Road,
Munirka,
New Delhi-110 067.
5. Shri A. M. Nimbalkar,
Director of Employment and Training,
Ministry of Labour, Shram Shakti Bhavan,
New Delhi.

6. Mrs. B. K. Karthayani, D-4,
Kaveri Apartments,
Alaknanda Colony, New
Delhi.
7. Dr. K. B. Shanna,
Deputy Director General of Health
Services,
Directorate General of Health Services,
New Delhi.

No. U. 11020/2/86-ML(P)

Government of India

Ministry of Health & Family Welfare
(Department of Health)

New Delhi, dated the 21st May, 1986

In partial modification of this Ministry's Resolution No. U. 11020/2/86-ME(P), dated 8th May, 1986 (copy enclosed), it has been decided to nominate a representative of the Ministry of Human Resource Development (Department, of Education) as a member of the Committee.

It has also been decided to authorise the Chairman to co-opt any person as a member who in his opinion can help the Committee in its work,

Sd/-

(P. K. UMASHANKAR)

*Additional Secretary to the
Govt, of India.*

Copy to:—

Secretary, Ministry of Human Resource Development (Department of Education) with the request to nominate their representative on the Committee of experts.

Sd/-

(SHIV DAYAL) *Deputy Secretary to the Govt, of India* Copy to ;—

- | | |
|--|-----------------|
| 1. Prof. J. S. Bajaj,
Prof. of Medicine,
AIIMS, New Delhi. | <i>Chairman</i> |
| 2. Dr. Harcharan Singh*
Joint Adviser,
Planning Commission. | <i>Member</i> |
| 3. Shri Satya Bhushan,
Director, National Institute of
Educational Planning & Administration | <i>Mather</i> |
| 4. Dr. J. P. Gupta,
Joint Director,
National Institute of Health and
Family Welfare. | <i>Member</i> |

5. Shri A. M. Nimbalkar, *Member*
Director of Employment and Training, Ministry
of Labour.
6. Mrs. B. K. Karthayani *Member*
D-4, Kaveri Apartments,
Alaknanda
Colony, New
Delhi.
7. Dr. K. B. Sharma, *Member-*
Deputy Director General of *Secy.*
Health Services,
Directorate General of Health Services,
New Delhi.

Sd/-

(SHIV DAYAL)
Deputy Secretary
to the Govt. of
India

Copy to :—

P.S. to Secretary, Ministry, of Health &
Family Welfare, Nirman Bhavan, New Delhi.

No. U. 11020/2/86-ME(P)

Government of India

Ministry of Health & Family Welfare

Department of Health

New Delhi, dated the 1st August, 1986

ADDENDUM

Reference this Ministry's resolution No. U. 11020/2/86-ME(P), dated the 8th May, 1986 and corrigendum of even number dated 29th May, 1986 constituting a committee of experts by the Ministry of Health & Family Welfare to determine the manpower requirements in the medical and allied health related areas, and to make definite recommendations regarding the creation of additional vocational training facilities.

2. Shri S. K. Handa, Deputy Educational Adviser (H), Department of Education, Ministry of Human Resources Development has been nominated as a member of the committee of experts with immediate effect.

(P. P. CHAUHAN)

Joint Secretary

To

1. Prof. J. S. Bajaj, *Chairman*
Prof. of Medicine,
AIIMS,
New Delhi.
2. Dr. Harcharan Singh, *Member*
Joint Adviser,
Planning
Commission, New
Delhi.

3. Shri Satya Bhushan, *Member*
Director,
National Institute of
Educational Planning & Administration,
17-B, Sri Aurobindo Marg,
New Delhi.

4. Dr. J. P. Gupta, *Member*
Joint Director, National
Institute of Health & Family
Welfare, New Mehrauli
Road, Munirka, New Delhi.

5. Shri A. M. Nimbalkar, Director *Member*
General of Employment
and Training, Ministry of
Labour, Shram Shakti
Bhawan, New Delhi.

6. Mrs. B. K. Karthayani, *Member*
D-4, Kaveri Apartments, Alaknanda
Colony, New Delhi.

7. Dr. K. B. Sharma, *Member*
Deputy Director General
of Health Services, "
D.G.H.S.,
New Delhi,

8. Shri S. K. Handa, *Member*
Deputy Educational Adviser(H),
Ministry of Human Resources Development,
Department of Education,
Shastri Bhawan,
New Delhi.

(with a copy of the resolution dated 8-5-1986).

Copy forwarded to:—

1. Secretary, Deptt. of Education, Ministry
of Human Resources Development with
reference to his d.o. Dy. No. 3635/ES/ 86,
dated 8-7-1986.
2. P. S. to Secretary, Ministry of Health and
Family Welfare, New Delhi.

No. U. 11020/2/86-ME(P)

Government of India

Ministry of Health & Family Welfare

Department of Health

New Delhi, dated the 5th September, 1986

Resolution

Reference this Ministry's Resolution No. 11020/2/86-ME(P), dated the 8th May 1986 and order of even number dated the 8th May 1986 it has been decided to extend the term of the committee set up to make definite recommendations regarding the creation of additional vocational training facilities upto 31-10-86

for submission of the final report with comprehensive coverage of all terms of reference detailed in the resolution of 8-5-1986 indicated above.

Sd/-

(SHIV DAYAL)
*Deputy Secretary
to the Govt. of
India*

Copy to :—

- | | | | |
|-----------------------|--|---|----------------|
| 1. Prof. J. S. Bajaj, | | 5. Shri A. M. Nimbalkar, | <i>Member</i> |
| | | Director of Employment and Training, | |
| | | Ministry of Labour, New Delhi. | |
| | | 6. Mrs. B. K. Karthayani, | <i>Member</i> |
| | | D-4, Kaveri Apartments, | |
| | | Alaknanda Colony, | |
| | | New Delhi. | |
| | | 7. Dr. K. B. Sharma, | <i>Member'</i> |
| | | Deputy Director General of | <i>Secy.</i> |
| | | Health Services, | |
| | | Directorate General of Health Services, | |
| | | New Delhi. | |
| | | 8. Shri S. K. Handa, | <i>Member</i> |
| | | Deputy Educational Adviser, (H) Ministry | |
| | | of Human Resources Development, New | |
| | | Delhi. | |
| | | Copy to P.S. to Secy., Ministry of Health | |
| | | & F.W., New Delhi. | |

1. Prof. J. S. Bajaj,

Chairman

n

Prof. of Medicine,
AHMS, New
Delhi.

2. Dr. Harcharan Singh,
Joint Adviser,
Planning Commission,
New Delhi.

Member

3. Shri Satya Bhushan,
Director, National Instt. of
Educational Planning &
Admn. New Delhi.

Member

4. Dr. J. P. Gupta,
Joint Director,
National Institute of Health &
F.W. Munirka, New Delhi.

Member

• • •

ANNEXUR 2

Composition of the Expert Committee

Chairman

Prof. J. S. Bajaj

Members

Dr. Harcharan Singh

Shri Satya Bhushan

Dr. J. P. Gupta

Shri A. M. Nimbalkar/

Shri K. C. Saxena

Mrs. P. K. Karthiyani

Shri S. K. Handa

Special Invitees

Shri D. N. Chauhan, Secretary,
Dental Council

Prof. A. K. Mishra, N.C.E.K.T.

Shri D. K. Jain Secretary, Pharmacy
Council

Mrs R. K. Sood, Secretary, Nursing
Council

Member-Secretary

Prof. K. B. Sharma

Special Invitees

Shri S. K. Giri

Shri S. C. Basu

Dr. B. K. Verma

Dr. P. N. Ghei

Mrs. Sudha Rao, N.I.E.P.A.

Dr. M. M. Mukhopadhyaya, N.I.
E.P.A.

Dr. Brahm Prakash, N.I.E.P.A.

Shri G. D. Sharma, C.B.H.I.

Prof. P. K. Khosla

Staff

Shri M. C. Sharma

Shri P. C. Joshi

Methodology of Projection of Demand of various categories of personnel

To project the demand of various categories of para-medical and ancillary manpower, the ratio method of projection was found appropriate considering the availability of data. Thus the projection has been made on the basis of prescribed norms of various categories of paramedical personnel for various types of rural health centres on the basis of projected figures of population from 1986 to 2001 which has been taken from the publication of Registrar General of India. The step-wise detailed methodology is as follows :

1. The projected population figures from 1986 to 2001 have been taken from the publication of Registrar General of India from the publication projections under medium, fertility assumptions. See Table-8.
2. The demand of community health centres/ primary health centres/Sub-centres and village Health Guide have been projected on the basis of norms in relation to population as given below utilizing the projected population in the year 1986, 1991 and 2001.

<i>Rural Health Centres</i>	<i>Norms</i>
I. Community Health Centres (G)	1 per 1,00,000 population
II. Primary Health Centres (i)	
in plains (ppi)	1 per 30,000 populations
(ii) in difficult areas (pdi)	1 per 20,000 population
III. Sub-centres	
(i) in plains (SPi)	1 per 5000 population
(ii) in difficult areas (Sdi)	1 per 3,000 population
IV. Village Health Guides (Vi)	1 per 1,000 population

Mathematically $H_i = n \times P_i$

Where H_i is the projected demand of Rural Health Centres/Village Health Guides in the i th year.

(H_i may be $C_i, P_i, P_{di}, S_{pi}, S_{di}, V_i$)

n is the norms for Rural Health Centre/Village Health Guide as given above.

P_i is the Projected Population in the i th year.

The projected figures may be taken from Table-1.

3. Based upon the projected number of rural health centres for various years, para-medical and ancillary personnel upto intermediate level have been projected on the basis of staffing norm indicated in Table-I by simple multiplication of number of personnel by number of rural health centres which can also be seen in Table-8.

Of Para-medical and ancillary personnel

The projected demand for personnel for various types of rural health centres have been consolidated for similar categories of personnel like Nurse, midwives, pharmacists, Lab, Technician and Health Worker (F).

A. The estimation for Nurses have been made for the entire country based on normative approach on the following varied assumptions:

Number of nurses required in :

1985 (on the basis of 5,10,152 hospitals beds)

1991 (on the basis of 0.73. beds per, 1000 population estimated for 1991) (The differences between present bed strength of 0.6 bed per 1000 population and 1 bed for 1000 population required by 2001 AD have been split equally between 3-Plan periods i.e. 1986-90, 1991-1995 and 1995-2001 AD).

Mathematically

$$B_i = n_i + P_i$$

Where B_i = Demand of Hospitals beds in i th year.

N_i = Bed population Ratio assumed for i th year.

P_i = Projected Population of i th year.

Based upon the projected demand of hospital beds for various years requirements of various categories of hospital nurses have been estimated on the basis of norms given in Annexure 7.

Suitability of present methodology of projection of demand of various categories of paramedical personnel in preference to methodology developed by IRMS, ICMR.

1. The population projections in the present method are those given by Expert Committee of the Registrar General of India. These projections have been prepared by the Registrar General by using a sophisticated method called as component method of population projection with reliable assumptions on fertility and mortality schedules in the coming years. While IRMS has used a mathematical model (Geometric growth model) assuming a constant compound growth rate of population same as the current level of 2.5% per annum, no care has been taken of the fact that rate of growth of population may decline in the coming years due to Family Planning measures being taken

by the Government of India. Also this Geometric growth rate model gives over-estimates of population with the increase in time from base year. As such, all the projections based on ratio method of projection using these overestimates of population will result in higher projections of demand of the para-medical manpower.

2. In the projections of Nurses by IRMS the Doctor-population ratio and nurse-doctor ratio have been used, with same arbitrarily constant as 3-nurses per doctor have been taken, for the computation. This method seems to be very inappropriate as nurses depend upon the bed-strength of various hospitals rather than on the number of doctors only.

In the present methodology, the projections have been made on more reliable assumptions considering the bed-population ratios in various years and achieving norm of 1 bed per thousand population by 2000 AD. Moreover, due consideration has been given to various categories of nursing services in relation to bed-strength, number of wards/shifts to achieve realistic projection of nurses in various years for country as a whole.

3. IRMS has projected the number of Pharmacists utilising the projections of number of doctors for various years assuming 1 Pharmacist is required for every 3 doctors. This is not a very reliable assumption.

In the present method, the number of Pharmacists have been projected on the basis of number of various Community Health Centres/Primary Health Centres as per the staffing pattern recommended for these Health Centres. As such, this methodology gives more accurate demand of Pharmacists in rural areas.

4. IRMS has not provided any projections for the para-medical personnel other than Pharmacists and Nurses. While in the present report projections of almost all categories of para-medical and ancillary personnel have been carried out on the basis of staffing pattern norms giving accurate projections of demand.

TABLE 8 HEALTH
MANPOWER REQUIREMENT : 2000 AD

I. Population Estimates

Projected Population for 2000 991,479,200
(Medium Assumption)

(Table No. 5 Hand book of H.
St. of India 1985)

Total Rural Population 743,609,400

(About—75% of Total Population)

(Hill, Tribal, Desert & difficult
area Population)

(10% of total) 99,147,920

Rural Plain Area Population 644,461,480

II. Infrastructure Requirements by 2000 AD

C.H.C.	7436	100,000	Pop.
PHC's	26439	Plain	Difficult
		(21482	4957)
		3 0.000 Pop.	at 20.00
			Pop.
Sub-Centres	163941	Plain Area	
		(128892	+ 33049)
			Area
		at 5,000 Pop.	at 3,000
			=161941

III Manpower Requirements by 2000 AD

Community Health Centre (N=7436)

Category of Personnel	Number
Block Extension	— 1
Nurse Midwife	— 7
Pharmacist	— 2
Lab. Technician	— 2
Radiographer	— 1
Dresser	— 1
Ophthalmic Assistant	— 1

Primary Health Centre (N=26439)

Community Health Officer	— 1	26,439
Pharmacist	— 1	26,439
Nurse Midwife	— 1	26,439
Health Worker (F)	— 1	26,439
Health Educator	— 1	26,439
Lab. Technician	— 1	26,439

Sub-Centres (n=161941)

Health Worker (M)	— 1	16,194
Health Worker (F)	— 1	16,194
Health Asstt. (M)	— 1 for 4 sub centre	40,485
Health Asstt. (F)	— 1 for 4 subcentre	40,485
Health Guide 1000 Pop.		7,43,610
Traditional Birth Attendants 1000 Pop.		7,43,610

Thus the total number of personnel required upto the level of Community Health Centres are given below:

SNo	Category	Numbers
1.	Nurse Midwife	
	(CHC*)	52,052}
	(PHC)	26,439}
2.	Pharmacists	
	(CHC)	14,872
	(PHC)	26,439}
3.	Lab. Technicians	
	(CHC)	14,872
	(PHC)	26,439/}
4.	Radiographers (CHC)	7,436
5.	Dressers (CHC)	7,436
6.	Community Health Officers (PHC)	26,439
7.	Health Educators (CHC)	7,436
8.	Health Workers (F) (PHC)	26,439
	(PHC)	26,439 \
	(SC)#	1,61,941/
9.	Health Workers (M) (SC)	1,61,941
10.	Health Asstts. (F) (SQ)	40,485
11.	Health Asstts. (M) (SC)	40,485
12.	Health Guides	7,43,610
13.	Traditional Birth Attendants	7,43,61

* CHC—Community Health Centre

PHC—Primary Health Centre.

#SC—Sub-Centre.

ANNEXURE 4

Report of Previous Committees and Publications referred to by the Committee

1. Health Survey and Development Committee (Bhore Committee)—1946.
2. Health Survey and Planning Committee (Mudaliar Committee)—1961.
3. Special Committee on the Preparation of Entry of the, NMEP into maintenance phase (Chaddha Committee)—1963.
4. Staffing pattern and Financial provision under Family Planning Programme (Mukherjee Committee)—1965.
5. Committee on Multipurpose Worker under Health and Family Planning (Kartar Singh Committee) — 1973.
6. Group on Medical Education and Support Manpower (Shrivastav Committee)—1975.
7. Group on Medical Education, Training and Manpower Planning—Planning Commission—1984.
8. National Policy for Education—1968.
9. National Health Policy—1983.
10. Kulandaiswamy Report—1985.
11. National Policy on Education—1986.
12. Job responsibilities of staff of P.H.C.—Ministry of Health & Family Welfare—1986.
13. WHO/SEARO document. Inter-regional Consultancy on Health Manpower Management, Bangalore—November 1983.
14. Report of first inter-state workshop on Health Manpower Management—1985, D.G.H.S., M.O. H.F.W.
15. Bajaj J.S. 1986—Health and Education—An inter, face for Human Resource Development (Mudaliar Oration) Indian J. Med. Edu. 25,19-44.
16. Ghosh B. 1982—Health Services Management. An Indian casebook—IIM Bangalore.
17. Mathur P.N. 1932— Manpower Journal, Vol. XVII.

ANNEXURE 5

Report of the Sub-Committee consisting of Prof. J. S. Baja] (Chairman), Prof. Satya Bhushan, Prof. A. K. Mishra (Coopted), Dr. K. B. Harcharan Singh (Hyderabad only) and Prof, Sharma (Member-Secretary) on the visit to Bangalore, Madras & Hyderabad.

The sub-committee visited the three States of Karnataka, Tamil Nadu and Andhra Pradesh where the vocational courses have been introduced earlier.

1. Bangalore (Karnataka) 22-23rd October '86

The sub-committee met the Director of Vocational Education, Shri S. G. Patil, Director of Health Education, Dr. Javare Gowda and others including Principal, Science Teacher and students of X-ray technician course at Visves-varapuram College, the Principal and the teacher in-charge of the laboratory technicians course at MES College.

The D.V.E. informed the sub-committee that the operational courses in health field are Lab. Technicians, MPW, X-ray technicians and Opticians. The last mentioned course was discontinued for some time but has again been resumed. It was also pointed out by the D.V.E. that approximately 4% of 1,25,000 students of class X, i.e., about 6000-7000 opt for vocational courses of which 2000 return to the general stream. 4000-5000 students continue in the vocational stream. Compared to the total intake of students in vocational courses, the number of students in the health related courses is very low.

Evaluation of the needs of the jobs has not yet been done effectively. Evaluation of courses has not been done but recently the Govt. of Karnataka has allocated Rs. 1 lakh for establishment of a panel which will evaluate the courses. It was decided that a more effective coordination between the departments of health (Health Education & Training) and Education (Vocational Education) will be started and a planning cell will be set up. It was felt that the sensitisation stimulus for opting for vocational studies should be started from class VIII or in other words, pre-vocational courses will be offered in the classes VIU, IX and X. Incidentally, it may be pointed out that such courses have been planned and are being carried out in Andhra Pradesh. As far as the curriculum is concerned, in Karnataka, 25% of the teaching time is devoted to the general educational stream and 75% for the vocational courses of which 40-50% is devoted to practicals and 30% to theory. The practicals are held in a hospital setting.

The professional manpower development should also go into the question of training of

trainers as well as development of teaching materials. Special books for this class of students must be prepared. The D.V.E. said that student of these courses are at a distinct disadvantage for securing jobs as against the students trained through courses organised by the Deptt. of Health which are given at several hospitals. The D.H.E. promised to look into this matter. It was suggested that a workshop may be held in the State which should go into the question of :—

- (a) Resource planning,
- (b) Health Manpower Planning, and
- (c) Training techniques.

During the visit to Visvesvarapuram College, discussions were held with the teachers as well as with the students. The teachers were of the opinion that there is a pressing need for training of teachers, enunciation of the instructional objectives, development of teaching methods, curricula and quality control of the teaching processes.

In an interesting discussion with the students, certain points came up rather forcefully. The main motivation for them to join such course is that they are able to find jobs at the completion of the courses. In this College, X-ray technician course is conducted. Though the vocational course is a 2-year course after class 10 as opposed to the course conducted by the Health Deptt. which is only one year course after class 10, the boys strongly felt that job potential was more for the Health Deptt. trainees. The Physics teacher at the Visves-varapuram College felt that there must be a 6-month intensive training in PCM before sending them to the hospital. When the students were asked whether they preferred a Govt. job or private job, they were all in favour of Govt. jobs. Another interesting point that came up. in the- discussions with the students was that better vocational courses were being given in the larger cities because better equipment and hospitals are available there. Most of the students' who were undergoing the training course for X-ray technicians came from a rural background primarily because of better job prospects.

On the visit to MES College, where only Lab. Technician course is conducted, it was found that they were having collaboration with the teaching hospitals, Bowering Hospital and Victoria Hospital. Their teacher is a qualified

Pathologist and the examinations are conducted by Professors of Medical College. The interesting outcome of the visit focussed very sharply on the self-employment potential for the students of this course and quite a number of them are flourishing. Bank loans up to Rs. 25,000 are easily available to such students. Here also, the paucity of special course books for such courses was felt and the suggestion came for development of such books.

2. Madras (Tamil Nadu) 24th October '86

The sub-committee met the Minister of Health, Shri P. U. Shanmugham, the Health Secretary, the Education Secretary and the Deputy Director of the Higher Secondary Education. The Committee visited Govt. Higher Secondary School, Chromepet, where a course in MLT is being offered and Avvai Higher Secondary School for Girls, Adiyar, where a nursing course is being conducted. The courses offered in Tamil Nadu in the Health stream are Laboratory Technician, Pharmacist, Nurses. The hospital housekeeping is one of the listed courses and it is being offered only at one place in Coimbatore.

On the visit to Govt. Higher Secondary School, Chromepet, the Committee met the Principal, the teacher of the MLT course, the Chemistry teacher and the Zoology teacher. This course is entirely carried out in the Higher Secondary school and there is no hospital attachment. The specimens are received from King's Institute or a private laboratory run by a doctor who is on the Advisory Board of the School. The course started in 1983 and the first batch appeared in 1985 when out of the 12 candidates who appeared, 6 passed and the 6 who failed, failed in English. In this course, all the theory lectures were given in Tamil and there was no text-book. The teacher himself is a student of B.Sc and holds a one-year certificate course of King's Institute. There are no text-books but the teacher collects the notes from here and there and also uses his own lecture notes when he was a student at King's Institute. On the whole, though the training in bio-chemical techniques was satisfactory, in Bacteriology only theory was being taught and there was absolutely no training in Histo-pathology. The basic foundation science lectures were satisfactory.

On the visit to Avvai Home TVR Higher Secondary School where vocational course for nursing is offered, the Committee met the Principal, Asstt. Head Mistress, 2 Nurse Teachers who were retired nurse tutors in the Govt. However, in this School, in the nursing course, 60% time is given to the general course of languages, Chemistry, Physics and Zoology. For the vocational course of nursing, only 40% time was being given. For practical training, the students visit 8 hospitals, each for a few days. The course has been running since 1979. The big disadvantage for the students

of the School is that the course is not recognised by the State Nursing Council. So their employability potential was only in private hospitals, private nursing homes or domiciliary practice. The guide book for trainers and a text-book in Tamil is available for this course, it was suggested during the discussions that they must have an apprenticeship period of at least 3 months in a recognised hospital. In the discussions with the Health Secretary, it was brought out that there is a surplus in nursing profession in Tamil Nadu. A coordination of the State Planning Commission, Health Deptt. and the Education Deptt. is essential to work out the projections for health manpower needs of various categories and for development of the health manpower in the State.

The meeting with the Education Secretary was very revealing in that of all the vocational courses, the health courses are not doing well due to lack of recognition. The course books are available for nursing but not for others and a greater collaboration is needed between Education, Health and Planning Departments. The Educational materials are to be developed in collaboration with the Health Deptt. preferably at the Directorate level. Apprenticeship concept must be introduced in connection with these courses. It was felt that Govt. of India should strengthen the vocational schools. There was a general observation that vocational courses are more accepted in the rural areas because of the better job prospects than for the students in the general stream.

3. Hyderabad (Andhra Pradesh) 25th October '86

The Committee visited the Dental College and met Dr. Seshadiri, the Principal. He is the pioneer in introducing Dental Hygienist and Dental Mechanist courses in the State. The Committee also met the Vice-Chancellor of Health Sciences University, Dr. K. N. Rao. The Committee had discussions with the Secretary of the Board of Intermediate Education which coordinates the vocational courses. At the Osmania Medical College, the Committee met and held discussions with the Principal of Osmania Medical College, Principal of RFPTC, Joint Director of Medical Education and the joint Secretary of the Board of Intermediate Education.

There are only 4 health related courses in the vocational stream in Andhra Pradesh. Pharmacist course is offered in 11 schools; Medical Lab. Assistant in 4 schools; Dental Hygienist and Dental Mechanist in Dental College, Hyderabad only.

During the visit to the Dental College and during discussions with the Principal, it was brought out that there was a strong objection for the course of Dental Hygienist by the Dental Council in the earlier stages because of the apprehension that such course may turn out half-baked dentists. However, the role of dental

Hygienists is more of a dental nurse who can carry out preliminary procedures like scaling and polishing but not the advanced dental procedures. He helps as a chair side assistant to the professional dental surgeon. Dental Mechanists/Dental Technicians are more or less utilised for preparation of prostheses. 30% of the time is spent for general stream courses of English, Chemistry, Physics and 70% for the vocational courses. The course has now been recognised by the Dental Council. The Chairman floated a question whether a Dental Hygienist could be trained into a Dental Therapist after an additional 6-9 months course for advanced skills so as to provide an avenue of vertical movement.

The Committee had detailed discussions with the Vice-chancellor Dr. K. N. Rao regarding the scope of the Health Sciences University. Delineating the various functions of the HSU, Dr. Rao said that it would lead to uniform standards in medical education and would also encompass all systems of medicine including the indigenous systems. A common entrance examination for all the systems is being given serious consideration. All efforts will be made to keep up the international standards. To begin with, a community health sciences centre of modern system of medicine will be established at Vijayawada and affiliation of the medical colleges of Andhra Pradesh will be taken up later. Dr. Rao agreed with the suggestion of the Chairman that faculties of health economics, health systems research and health information

systems, should be important constituents of HSU. The HSU, Andhra Pradesh will also have a department of medical education technology and will also take up the para-medical courses. The Vice-Chancellor having joined only 2-3 days before meeting the Committee commented that he is keeping an open mind and was carrying out discussions with various categories of health professionals so as to develop the appropriate programmes of medical and para-medical education.

In the meeting with the Secretary of the Board of Intermediate Education, he informed the sub-committee that pre-vocational sensitisation has been introduced in classes IX and X to promote awareness and to sensitise and motivate the students for health related courses. In each school, students are exposed to the pre-vocational sensitisation. This has replaced SUPW and 40 students per school are selected for the pre-vocational sensitisation. This has been recently introduced and will need some time before it can be evaluated. It was felt that a better coordination will improve the philosophy of pre-vocational health related instruction.

In the discussions at the Osmania Medical College, the Principal, RFTPC, showed a book which was a Telugu translation of a book on pre-vocational health related courses for classes VIII, IX and X but it was felt that the book needed a lot of revision to make it an effective tool for spreading the message.

= = =

ANNEXURE 6

All the Deans of Medical Colleges, Directors of Medical Education of States and Union Territories and secretaries of Medical, Dental, Nursing and Pharmacy Councils were approached by the Committee for their comments and suggestions in relation to the terms of reference of the Committee.

In spite of repeated reminders, replies, comments and suggestions were received from the following, which were considered by the Committee :—

1. Dental Council of India
2. Pharmacy Council of India,
3. Nursing Council of India.
4. Director-General, Armed Forces Medical Services.
5. Director, Health Services, Andaman & Nicobar Administration.
6. Director, Health Services, Goa.
7. Principal, SMS Medical College, Jaipur.

8. Principal, Medical College, Amritsar.
9. Principal, G.S.V.M. Medical College, Kanpur,
10. Principal, V.S.S. Medical College, Burla.
11. Principal, Kasturba Medical College, Manipal.
12. Principal, Kasturba Medical College, Mangalore.
13. Principal, Dayanand Medical College, Ludhiana.
14. Dean, Medical College, Chingleput.
15. Health Secretary, Govt, of Kerala.
16. Principal, Christian Medical College, Vellore.
17. Dean, Maulana Azad Medical College, New Delhi.
18. Dean, T.N. Medical College, Bombay.

The Committee gratefully acknowledges their comments and suggestions.

ANNEXURE 7

Manpower Requirement for Hospital Nursing Services

Categories	Basis of Calculation	Nursing man power requirement		
		1986	1991	2001 A.D.
1. Nursing Superintendent.	1:200 beds	2,500	3,051	4,955
2. Deputy Nursing Superintendent.	1:300 beds	1,700	2,034	3,003
3. Departmental Nursing Supervisors/Sisters.	7:100041/Addl 1000 beds. (991x7+991)	4,080	4,880	7,928
4. Ward Nursing Supervisors/Sisters.	8:200 + 30 % leave reserve.	26,520	31,730	51,532
5. Staff Nurses for Wards.	1:3 (or 1:9 for each shift)+30% leave reserve.	221,000	2,64,427	4,29,432
6. for OPD Blood Bank, X-Ray, Diabetic Clinics, CSR etc.	1:100 Opt.(1bed:5 Opt.)+ 30% leave reserve.	33,160	39,664	64,415
7. for Intensive (8 Beds ICU/200 beds).	1:1 (or 1:3 for each shift)+30% leave reserve.	26,520	31,730	51,530
8. for Specialized departments and Clinics such as OT, Labour Room.	8:200+30% leave reserve.	26,520	31,730	51,530
Total		3,42,050	4,09,246	6,64,623

ANNEXURE 8**Summary at a glance -Indian systems of Medicine and
Homoeopathy**

Sr. No.		Ayurveda	Unani Medicine	Siddha	Homoeopathy	Total
1	2	3	4	5	6	7
1.	Hospitals	1,452	98	105	121	1,776
2.	Beds	15,708	1,217	885	3,306	21,116
3.	Dispensaries	11,100	860	311	2,163	14,434
4.	Registered Practitioners	2,43,153	28,021	11,500	1,22,173	4,04,856
5.	Colleges	95	17	1	112	225
6.	Admission Capacity	3,767	655	75	7,224	11,721
7.	Post-Graduate Institutes	22	2	1		25
8.	Admission Capacity	242	27	20	••	289

ANNEXURE 9**Coverage of Adult Education Programme in India**

(Figures of enrolment in Millions)

Year	No. of Centres	Total No. of learners	Male	Female	Scheduled Castes	Scheduled Tribes
1980-81	92105	2.59	1.59 (61-43)	1.00 (38 -57)	0.62 (24-1)	0.45 (17-3)
1981-82	109238	3-10	1.83 (59-17)	1.27 (40-83)	0.84 (27-15)	0.57 (18 47)
1982-83	150849	4-36	2.58 (59-14)	1.78 (40-86)	1.17 (26 -75)	0.79 (18-13)
1983-84	176107	5-15	2.79 (54-19)	2.36 (45 -81)	1.36 (26 -62)	0.85 (16 48)
1984-85 (Upto December 1984)	186510	5-53	2.64 (47-77)	2.89 (52 -23)	1.54 (27-84)	0.88 (15-91)

Percentage of enrolment to the total number of learners is in parenthesis.

ANNEXURE 10

Coverage of non-Formal Education Programme 1984-85

(Provisional)

State	No. of NFE Centres		Enrolment in NFE Centres				Percentage of		Percentage of	
	Primary Level	Middle Level	Primary Level	Middle Level	NFE Centres to Formal Schools		Enrolment in NFE Centres to Enrolment Schools			
			Total	Girls	Total	Girls	Primary Stage	Middle Stage	Primary State	Middle State
1	2	3	4	5	6	7	8	9	10	11
Andhra Pradesh	17790		443861	164063			42-66		6-78	••
Assam	6508	200	199457	103542	6670	3120	25-20	N.A.	8-6	0-7
Bihar	12806	1200	269316	133981	35910	N.A.	N.A.	N.A.	4-92	N.A.
Jammu & Kashmir	1863		33521	16517	..	..	17-4	..	5 16	..
Madhya Pradesh	11974	3306	237869	124444	69700	11000	19-34	28-02	3-69	3-32
Orissa	7060	500	163200	50000	8600	2000	19-51	6-07	5-09	1-10
Rajasthan	10125		274562	160537		..	41-27	••	7-10	••
Uttar Pradesh	18629	3901	704054	285320	84553	28128	25-3	26-69	6-01	2-27
West Bengal	18260		469000	215000	••		35-25	••	5-08	
TOTAL	105015	9107	2913970	1253404	194833	44248				

ANNEXURE 11

Number of Institutions Running Vocational Courses at the +2 Stage and Enrolment therein

SI No	State/Union Territory	No. of Institutions								Enrolment									
		1977	1978	1979	1980	1981	1983-84	1984-85	1977-78	1978-79		1979-80			1980-81		1981-82		1983-84
									XI	XII	XI	XII	XII		XI	XII	XII		XI
1.	Andhra Pradesh	Nil	Nil	22	77	82	107	108	Nil	Nil	Nil	Nil	516	Nil	1350	516	1550	135	3310
2.	Gujarat						66	54											3701**
3.	Karnataka	13	45	76	82	95	109	132	1030	Nil	2148	827	2726	1713	3085	1619	2901	2179	4450
4.	Maharashtra	Nil	33	107	155	206	250	314	Nil	Nil	1958	Nil	5463	1707	7385	4794	9039	6605	10508
5.	Tamil Nadu	Nil	709	911	944	1014	N.A.	N.A.	Nil	Nil	24400	Nil	26942	25013	31973	25115	32350	29066	N.A.
6.	West Bengal	69	63	62	62	53	N.A.	N.A.	2493	1870	2350	2400	2285	2300	2663	2275	1517	1567	N.A.
7.	Delhi	17	17	17	15	16	15	22	700	Nil	484	494	473	484	538	417	778	523	734
8.	Andaman Nicobar	Nil	Nil	Nil	Nil	1	Nil	N.A.	NA	Nil	Nil	Nil	Nil	Nil	Nil	Nil	25	Nil	N.A.
9.	Pondicherry	Nil	5	5	5	5	7	N.A.	Nil	Nil	199	Nil	180	193	184	159	254	225	295
10.	Kerala						21	71											819
11.	Assam						16	N.A.											N.A.
12.	Haryana						22	29											1 920
13.	Goa, Daman and Diu							3											

NCERT Data

** For new courses at + 2 stage.

ANNEXURE 12

VOCATIONAL COURSES

REGULATIONS, SYLLABI

JOB DESCRIPTIONS

Based on cumulative experience of different States in several health related vocational courses of instruction, only general guidelines are being provided for further consideration.

ANNEXURE 12/A

Vocationalisation at the XI and XII Standards

2-YEAR CERTIFICATE COURSES (SEMESTER SYSTEM)

1. Qualifications for admission

- (a) Admission to all the vocational courses shall, in general, be open to all students who have passed:
 - (i) Class X examination of Central Board of Secondary Examination, the SSLC Examination conducted by the State Secondary Education Boards; or
 - (ii) The Indian Certificate of Secondary Education Examination conducted by the Council for the Indian School Certificate Examination; or
 - (iii) Any other Examination recognised as equivalent to the CBSE class X examination.
- (b) Admission shall be made on the basis of merit in the qualifying examination, an aptitude test and interview conducted by a Selection Committee.

2. Duration of the course

The course of study shall extend over a period of 2 academic years consisting of 4 semesters.

3. Medium of Instructions and Examinations

The medium of instruction and examination in the course shall be English.

4. Courses of Study

- (a) Course shall extend over 4 semesters. Approximately 700 hours study in each semester.

- (b) There will be two streams of study:

General Stream

English, Local Language, Chemistry, Physics and Biology.

600-700 hours, spread over first two semesters. Common to all health-related courses.

Vocational Stream

Need based curricula for the different courses.

1500-1600 hours, spread over 2nd, 3rd and 4th semesters.

- (c) After qualifying the course the candidate has two possibilities :

- (i) Opt for a B.A., B.Sc. or higher health-related course and compete in the entrance examination courses in which admission could be sought:

MBBS

BDS

B.Sc. Nursing

B. Pharmacy

B. Lab. Technology

- (ii) Opt for employment in the chosen vocation. Before the employment is taken, an apprenticeship training of 750 hours be taken in a recognised institution in order to qualify for the employment.

5. Minimum Attendance

90% attendance in each of the subjects shall be deemed minimum necessary in each semester.

6. Condonation of shortage of attendance

The Heads of Institution shall have power to condone shortage of attendance upto 15% of the total number of working periods in each subject.

7. Admission to the Semester Examination

- (i) Admission to the Semester Examination shall be open to candidates who satisfy the attendance required in all the subjects of the semester.
- (ii) and whose progress and conduct is satisfactory as per the certificate of the Head of the Institution.

8. Minimum for a pass

- (a) No candidate shall be declared to have passed any semester Examination unless he ob-

tains not less than 35% of the marks in each of the theory papers and 50% in each of the practical papers prescribed for the Examination for both internal assessment and external examination put together for that paper.

- (b) If he has not passed in the semester examination fully, a candidate securing not less than 40% in any theory subject and 50% marks in any practical shall be exempted from appearing in that subject.

9. Promotion from one semester to another

10. Promotion from the first semester to the second and from the third semester to the fourth is automatic.

11. However, promotion to the third semester shall be subject to the condition that a candidate should not have failed in more than two papers of first and second semester taken together.

12. The results of final semester shall be withheld until a candidate has passed in all the papers of all the semesters and has submitted the report of the institutional or field training diary and the same has been judged as satisfactory.

ANNEXURE 12/B Syllabus of General

stream courses

Courses conducted in Higher Secondary Schools at the +2 level. Preferably classes held in the afternoon.

ENGLISH

PHYSICS

CHEMISTRY

BIOLOGY

ENGLISH

This course aims at developing skills of reading comprehensions and writing free and guided composition. It also aims at enabling the student to master the techniques involved in writing business correspondence.

The course will be divided into three parts :—

1. Basic Language

An intensive course in grammar spelling, punctuation, elementary comprehension and composition.

2. Reading Prescribed Text

The text book will be used for detailed reading comprehension, grammar, pronunciation vocabulary, expression, translation

and topics for discussion (Translation here involves translating the sense rather than transliteration. the foreign students, if any, will be required to do precis writing).

3, Business Correspondence

Writing of business and official (formal) letters in connection with the profession. The students' will be introduced to way of writing business/official letters, correction of letters, respiting letters etc., as a part of developing their comprehension and composition skills.

NOTE

The examination paper at the final examination should

- (1) be based on text.
- (2) have more objective type of questions than essay type questions.
- (3) provide for adequate weightage of comprehension and guided composition.

ELEMENTS OF PHYSICS

1. Structure of matter—definition of atom, molecules, protons.
2. Simple phenomena of Electric neutrons current, Electrons, Electricity and Electrostatic force. Simple magnetic and Electromagnetic phenomena.
3. Simple physics of Heat—definition of heat temperature, production, transmission, measurement of heat.
4. Oscillations, Characteristics and types of emissions, visible, infra red and ultra violet radiations—their position in electromagnetic spectrum.
5. Electrical circuits: E.M.F. intensity of current resistance, Density of current practical units Ohms law Joules law, connection of circuit component in series and parallel.
6. Transmission of Electrical energy in solids and fluids.
7. Distribution of A.C. and D.C. mains supply light and power circuits. Safety devices and precautions
8. Definition, diagrammatical representation and physical properties of low frequency therapeutic currents—
 - Galvanic current
 - stimulating current
 - Modified galvanic, sinusoidal and faradic current
 - Regulation of current, modification of current, measuring devices.
9. High frequency therapeutic currents—

Short wave diagram—principles only. Construction and operation of valves, high frequency generators for therapeutic purposes—regulation and measuring devices.

10. Production or Radiation: Construction and operation of infra red rays, ultra violt generators.
11. Quartz niters, their applications.
12. Physiological effects of galvanic, faradic, sinusoidal and short wave radiations.

GENERAL CHEMISTRY

1. Structure of Atom.
2. Chemical Periodicity.
3. Radioactivity .
4. Chemical bonding and molecular shape.
5. Chemical Equilibrium.
6. Ionic equilibrium.
7. Acids and Bases.
8. Chemical Kinetiecs in Solution.
10. Oxidation and Reduction.
11. States of Matter.
12. Solutions.
13. Surface Chemistry.

ORGANIC CHEMISTRY

1. General introduction and Nomenclature.
2. Hydrocarbons (Saturated).
3. Hydrocarbons (Unsaturated),
4. Alcohols.
5. Ethers.
6. Aldehydes and Ketones.
7. Carboxylic Acids.
8. Carboxylic Acid Derivatives.
9. Halo Hydrocarbons.
10. Amines.
11. Benzene and other Aromatic compounds.
12. Fused ring Hydrocarbons.
13. Fats and Oils.
14. Proteins and Amino Acids.
15. Carbohydrates and Glycosides,,
16. Alkalides.

BIOLOGY

ZOOLOGY

1. Histology

Microscopic structure of animal tissues, Histology of mammalian organs (stomach, intestine, liver, spleen, lung, kidney, pancreas and gonads).

2. Anatomy and Physiology (with reference to frog) .

- (i) **Skin.**—Microscopic structure and Its functions.

- (ii) *system*.—Structure of respiratory *skeleton*.—Microscopic structure of bone and cartilage. General account of bones of frog.
- (iii) *Digestive System*.—Structure of alimentary canal and associated glands, digestive enzymes and their role in digestion, absorption of products of digestion, peristalsis.
- (iv) *Respiratory* organs, mechanism of breathing, gaseous transport, tissue respiration.
- (v) *Circulatory system*.—Functions of blood and lymph. Microscopic structure of blood and blood vessels, structure and working of heart, distribution of arteries and veins, circulation of blood, blood coagulation, blood groups.
- (vi) *Excretory system*.—Histology of kidney structure and function of kidney tubules, arrangement of excretory organs.
- (vii) *Nervous system*.—General account of brain, spinal cord and nerves, Histology of spinal cord, Reflex actions (simple and conditioned). Sense organs (eye and ear),
- (viii) *Productive system*.—General arrangement of reproductive organs, histology of testis and ovary.

3. Developmental Biology

Basic features of development in animals. Types of eggs, fertilization, cleavage, blastula.

Development of frog upto the formation of primary germ layers, tadpole and its adaptation metamorphosis of tadpole.

4. Diversity of Animal Life

Principles of classification, binomial nomenclature. General classification of animal phyla upto classes (in invertebrates) and upto subclasses/orders (in vertebrates), with detailed study of the types as indicated.

- (i) Protozoa, Amoeba, Entamoeba, Paramecium, Malaria Parasite, Trypanosomes.
- (ii) Prolifera.
- (iii) Coelenterate, Hydra.
- (iv) Platyhelminthes, Taenia solium, T. saginata.
- (v) Nematode, Ascaris lumbricoides.
- (vi) Annelida, Pheretima posthumai (General account and life history).
- (vii) Arthropoda, Cockroach, Insects and diseases. Life histories of housefly and mosquito.
- (viii) Mollusca.
- (ix) Echinodermata.
- (x) Chordata General Characters of fishes. General study of frog (Rana tigrina). General characters of birds.

5. Genetics and Evolution: (Fundamentals only)

Human genetics—Human chromosomes, sex-determination, sex-linked inheritance, Evidence and theories of organic evolution.

6. Ecology

Physical and biological factors influencing organisms. Food chain pyramid of numbers, biological equilibrium.

Interspecific associations (symbiosis).

BOTANY

Anatomy and

Physiology of Plants

Morphology—Plant growth and development.

Internal and external regulations of growth and development in plants; Internal structure of stem and secondary growth; Xylem and Phloem—their cell elements and functions; Internal structure of dicot and monocot leaves^ photosynthesis history, important factors and mechanisms, stomatal mechanism; transpiration and respiration, Internal structure of dicot and monocot roots.

Absorption and cell-water relations, transport of water and minerals, turgor and turgor movements.

Systematics

Principles of classical and modern systematics;

Binomial nomenclature.

Familiarity with taxa.

Systems: Differences between artificial and natural systems, identification of local flora (upto families).

Man and Environment

Soil rainfall and temperature with reference to natural resources.

Our natural resources—their uses and abuses.

Environmental pollution and preventive measures.

Cell Biology—Elementary

Introduction: Cell theory : Cell as a unit of life. Tools and techniques of cell studies: Microscopy (use of microscope and Calibration). Elements of microscope. Biomembranes—Transport—mechanism—, Cellular respiration. Cell organelles, their structure and functions. Hormones—their mode of action. Nucleus, chromosomes, DNA structure including events in replication and transcription.

- (a) Discovery of the nucleus—its structure and its importance in heredity.

(b) Discovery of chromosomes—their structure and role in heredity. Parallelism of behaviours between chromosomes and Mendelian factors, chromosomes theory of heredity.

(c) Discovery and structure of DNA, its role in heredity. Replication of DNA. Genetic code protein synthesis. Transcription.

Genetics

Organisation of the heredity material in chromosomes. Equational division. Reduction division. Mitosis and meiosis compared and contrasted. Significance of meiosis. Mendel's law of inheritance. Discovery of linkage, sex linked inheritance. Crossing over, Stage at which crossing over occurs. Neuro-sporadic genetics, Mutations, discovery, types of Mutations, Mutations in diploids and haploids, Role of Mutations and evaluation. Role in agriculture. Elaboration of Mendel's laws of inheritance. Mono-hybrid or Dihybrid crosses.

Reasons for the success of Mendel in his experiments. Absence of linkage in Mendel's experiments. Why did he not get linkage? Mendelism as the basis of genetics.

Development Biology

Significance of life cycles with special reference to alteration of generations as exemplified in *Escherichia coli*, *Chlamydomonas*, *Spirogyra*, *Funaria*, *Selaginella* and *Pinus* (No structural details).

Developmental stages in angiosperms, seed germination; juvenility, sporogenesis and gametogenesis, Fertilization, vegetative propagation. Differentiation; Abnormal growth in plants.

Botany and Human Welfare

Man and domestication of plants, important cultivated crop-cereals (wheat & rice) millets, pulses (gram), fibres, oil-seeds (groundnut), sugarcane, vegetables, fruits (mango & banana).

ANNEXURE 12/C

Syllabus of Core Health Foundation Courses

ANATOMY

PHYSIOLOGY

PATHOLOGY

DISEASES AND MANAGEMENT

SOCIOLOGY

ELEMENTS OF ANATOMY

1. Body as an integrated whole.
Introduction—Organisation of living things, cells, tissues, organs, cavities and body system.
Typical cell structure, properties of cell, living processes. Tissues, types, structures and functions. Skin.
2. Skeletal system—overview. Bones.
Skeleton. Surface anatomy and landmarks, Structure and function of joints—types of joints.
Muscular system—overview of skeletal muscles. Chief muscles and groups of muscles.
3. Nervous system—Brain, cranial nerves, spinal cord and nerve.
4. Organs of special senses—Eye, ear, nose.
5. Circulatory system—Heart, vessels, arterial, venous and capillary system.
6. Respiratory system—respiratory tract. Structure and function.
7. Digestive system—alimentary tract, oral cavity, stomach, intestine, salivary glands, liver, pancreas.
8. Urinary tract.
9. Endocrine system.
10. Human reproduction—Male and female reproductive organs.

ELEMENTS OF PHYSIOLOGY

Mitosis, tissue differentiation.

R.E. system—Function of R.E. system.

Osseous System—Physiology and function of long and flat bones in general.

Muscular—Function of voluntary and involuntary muscles in general including heart, uterus, iris, lungs, G.I. tract and diaphragm.

C.V.S.—Function of heart and blood vessels, capillaries, A.V. junctions, elements of physiology of circulation definition of blood RJB.C, W.B.C., platelets and blast cells.

Respiratory System—Functions of nose, pharynx, larynx trachea, bronchi and alveoli, pleural space physiology of respiration.

Digestive System—Digestion, mechanical and chemical. Enzymes. Absorption and assimilation of foods.

Urinary Tract—Urine formation. Composition. Micturition. Water and salt balance.

Reproductive System—Embryology, prenatal development, maturation of reproductive organs. Hormones, menstrual cycle. Reproduction.

ELEMENTS OF PATHOLOGY

Inflammatory

Pyogenic, granuloma-definition and importance and allergic reactions-parasitic-radiation-toxic-definition and examples Giddiness, vomiting-mucosal rashes-redness erythema, induration, dry reaction, wet reaction, angio-neurotic oedema, peripheral circulation collapse and shock.

Disorders of function

Amenorrhea. menorrhagea, menopause, sterilisation, thyrotoxicosis, acromegaly cretinism, dwarfism, achondroplasia.

Tumours

1. Epithelialturnouts-definition, general factors of each organ and tissue affected, Sq. cell, ca., adenoca.. basal cell c
2. Connective tissue tumour, sarcoma, villous tumours.
3. Nervous tissue tumours.
4. R.E. System-Leukaemias-definition-polycythemia multiple myeloma, lymphoma, reticular cells sarcoma, lymphoepithelioma.

DISEASES AND MANAGEMENT

Non-communicable disorders

Cardiovascular diseases.

Hypertension.

Myocardial infection.

Nutritional disorders.

Protein calorie malnutrition.

Hypovitaminosis.

Immunological and allergic disorders.

Anaphylaxis.

Joint and muscle disorders.

Arthritides.

Neoplastic diseases.

Endocrine disorders—Diabetes.

Sexual disorders,

Skin disorders.

Haematologic disorders.

Anaemia, bleeding disorders.

Pulmonary disorders.

Renal disorders.

Gastrointestinal disorders.

Gastric ulcers.

Neurological disorders.

Communicable diseases

Tuberculosis

Leprosy

Dysentery

Typhoid

Whooping cough

Tetanus

Diphtheria

Gonorrhoea

Syphilis

Malaria

Filariasis

Amoebiasis

Smallpox

Measles

Mumps

Rubella

Viral hepatitis

Viral encephalitis

Rabies

SOCIOLOGY

Objectives

1. To acquire knowledge of basic Sociological principles and processes as they relate to the individual family and community.
2. To gain an understanding of the social factors that affect community health, welfare and life.

Content

- I Groups—urban, rural. Administrative groups. Panchayats and Corporations. Crowd, public.
- II. Social processes—Competition-conflict, assimilation, adjustment. Individual and process of socialisation. Community social and health processes.

- III Social Controls—Traditions and customs. Folklore and mores. Laws. Social problems.
- IV. Social stratification—Caste, class, mobility, status, regionalism.
- V. Marriage and family—Marriage patterns. Joint family. Modern family.
- VI. Community—Rural—development, problems Urban—development, problems.
- VII. Human behaviour—Behavioural patterns in childhood, adolescence, adults and aged. Emotions. Social behaviour. Interpersonal relations.
- VIII. Learning, motivation and change in behaviour for health practices and health education.

ANNEXURE 12 / D / 1

VOCATIONAL COURSE

X-RAY TECHNICIAN

I. RADIOLOGY PHYSICS

1. Electrical circuit-single phase, three phase, high tension, transformers, auto transformers, condenser Rheostats, Rectifiers, valve and solid state voltage-Measurement of voltage, resistance, current Ohm's Law. Electromagnet spectra, wavelength, frequency, radiation, propagation, inverse square law.
2. X-Ray definition, production, properties.
3. X-Ray tube—structure of X-Ray tube—
Diagnostic—Fixed Anode
Rotating Anode-
Therapeutic—Dental.
4. X-Ray tube-spectrum-effects of variation in the tube potential and tube current.
5. Isotopes-Definition-Alpha, Beta, and Gamma rays.
6. Interaction of X-Rays with matter-Absorption of X-Rays by matter Secondary emissions, Compton effect, Photo electric absorption effect of wave length.

II. ORIENTATION TO X-RAY DEPARTMENT

1. Set up of lab-requirements of the Department.
2. Functions of the Department,
3. Study of various machines and their functions.
4. Simple operations.

RADIOGRAPHY

1. Radiological Anatomy of bones and joints-skull, P.N.S.
1. Radiography-bones and joints.
2. Practical work in Radiography,

PRACTICAL

Illumination-care of viewing boxes-stereo scope (Weight stone, binocular) Viewing aspect of films-Projection-Projectors and Projection screens.

DARK ROOM PRACTICE

The Patient.—Age-subject types and sex anatomical landmarks-Postural variations-erect and horizontal technique-Respiratory movements and diaphragm level-Regional densities-preparations and immobilisation of patient-pathological conditions-injuries, fractures and dislocations, congenital abnormalities-splints and appliances-comparative views-localized views-periodic examinations-use of dry bones-positioning terminology-identification system.

Care and Comfort of Patient.—Psychological approach to patient as an individual not as a case in relation to pathological condition-handling of fracture cases-stretcher and bed patients, method of dealing with helpless patients-ventilation and temperature of X-Ray room acidosis and cross-infection-general hygiene-Organisation to avoid delay-waiting and rest room-special apparatus for children.

BASIC RADIOGRAPHY

1. *Meaning of the terms.*—Density and gamma-elementary appreciation of characteristic curves; derivation there from of relative speed contrast, fog, development rate and gamma infinity-radiographic factors affecting image; contrast factors affecting the sharpness and definition of the radiographic image variation in exp. time due to change in quality of radiation, and to distance filters intensifying factors of screens, efficiency of grids speed of films, type of developer and development time.

2. *Radiography.*—Film gradation-kilo-voltage miliamperage-exposure-time- (MA Seconds) cones and diaphragms-radiographic grids intensifying screens-non-screens film-conditions of development.

Control of magnifications, distortion and perspective : Geometry of shadow projection-effect of focus-film distance. Control of beam cross. Area of X-Ray source-alignment of focus-focal film distance-subject-film distance-motional blur and exposure time effect of intensifying screens.

3. *Radiographic accessories.*—Control of beam cross-section by fixed aperture diaphragms-Variable aperture diaphragms-grids-centre ray finders-spirit level Angle boards-protractors-film holder-Calibration steps-Wedge-sandage and non-opaque pads,

4. *Faults in Radiographs.*—Density errors-contrast errors-unsharpness-light for X-Ray fog-development for-stains-dichronic-fog-mettle air-bells reticulation filling and stripping-blistering-half moon crumple marks-abrasion marks.

5. Reproduction of radiographs etc.

6. *Apparatus.*—Basic principles of the camera-construction of a photographic lens-focal length-brief outline of common lens aberrations the diaphragm and stop numbers-conjugate distances focussing-scale focussing type of

shutter-film and plate holders. Assembly for making reduced prints transparencies and lantern slides-basic principles of an enlarger apparatus for contact printing.

7. *Sensitive materials.*—Ordinary (Blue-sensitive) orthochromatic and panchromatic materials lantern plates types and grades of paper-speed of materials.

8. *Technique of exposure.*—Making positive image lantern slides by reduction making positive image reduced prints-making positive image-image intermediate transparencies-making and shading-copying charts and diagrams both black and white and coloured (using filters) contact printing from originals-contact printing from intermediate transparencies-onto lantern plates, paper or film for negative image reproductions making prints and transparencies by enlarging.

9. *Processing.*—Safelights for different materials (not dealt with previously) desensitisers-developers for various negative materials use of wetting agents-open tank development-closed-tank development standard development of negative materials-developers for prints and lantern plates-rinsing, fixing, washing and drying negatives-drying and glazing prints.

10. *After Treatment.*—Reduction and intensification-spotting and blocking out-finishing lantern slides-paste and dry mounting prints.

11. Cause of unsharpness-lack of contrast-excessive contrast graininess-reversal stains-fog-mettle air bells reticulation-drying marks.

12. *Defects in Prints.*—Causes of defects in respect of density-errors in contrast fog mettle-graininess greenish or brown tinge in black prints-purple discoloration-black and white spots-yellowing friction marks-greasy marks in glazed prints-oyester-sheli marks.

13. *Fluorescent screen Photography.*—The camera unit the fluorescent screen-sensitive materials-special processing methods.

CLINICAL RADIOGRAPHY

1. *Salivary glands.*—Demonstration of opaque salivary calculus. Technique for Parotid-submandibular-sublingual-glands and ducts.

Sialography.

Technique following injection of opaque medium.

2. *Liver.*—Technique for size and density-fluid levels.

Liver and Spleen.—Technique for preliminary examination-various subjects types methods of differentiation between biliary, renal and other shadows.

Cholecystography-Cholangiography.—Principles of physiology of the gall bladder preparation of patient-contrast medium-administration

of oral and intravenous function of non-fatty and fatty meal, double dose technique for non filling gall bladder, intravenous method, differentiation of gall bladder from other shadows. Technique for chole-cystography-com-bined cholecystography and opaque meal examination.

Principles.—opaque medium technique of injection screening, control technique for biliary fistula.

3. *Urinary Tract*.—Technique for general preliminary examination exposed kidney at operation—pathological specimens.

Pyelography Excretion (descending) Pyelography, principles-contrast media-preparation of patient-children, preparation of surgical tray-intravenous injection-reactions-systematic and local. Technique for serial radiography-variation of time intervals depending on suspected pathology-value of compression. Precaution and contra-indications.

Other methods of administration: (1) Oral; (2) Rectal; (3) Subcutaneous intra-muscular.

(b) *Retrograde (ascending) pyelography*: Principles-contrast media-Technique for general views-tube shift.

Cystography and Urethrography.

Principles contrast medium-method of injection.

Technique for general views-use of tilting couch.

Prostate—Technique for differentiation of prostatic and cystic shadows, Nephrography.

4. *Central nervous system*.—Special care of the neurological patient Technique for preliminary examination cranium neural canal.

Special Physiology

Ventricles;

Ventriculography, Encephalography; Principles, contrast media-administration-reactions
Radiographic technique Neural canal

Myelography:

Principles-contrast media administration-reactions.

Technique following sub-achnoid and epidural injections displaced intervertebral disc.

5. *Smith.—Petersen position*.—Description of surgical procedure-orthopaedic table-curved cassette film tunnels and supports-adaptations-technique.

6. *Bedside Radiography*.—Co-operation with nursing staff-adaptation of unit to patient. Technique for acute chest conditions Intestinal obstruction abdominal perforations-vertebral injuries-skull injuries fractures immobilised, e.g. Balkan Beam, Thomas splint, plaster cases, etc.

7. *Operating Theatre*.—Technique for (a) asepsis, (b) Anaesthetic dangers-appropriate precautions (see the recommendations of the British X-Ray and Radium Protection Committee).

Dark Rooms-Definition, purpose, size, location-light proof-Maze walls protective against chemicals and radiation-water proof floors-loading bench-disposal of drying cabinets-safety of dark room illumination and ventilation.

RADIATION PHYSICS

Radium-properties of Alpha, Beta and X-Rays, principles of transformation of the radium family. Absorption of X-Rays by matter, use of radium and radon: Preparation of radon-needles and tubes, precaution against loss. Measurement and filling of radium containers. Calculation of dosage per radium and radon sources, measurement of X-Rays. Recent advances in Radioactive Isotopes and Super-voltage tubes.

Hazards and protection.—Electrical protection, principles of X-Ray protections, measurements of stray radiation-back ground radiation practice of the patients, protection of staff, M.P.D. film badge service. Orientation for using therapy machines.

Treatment procedures-applicators, pin and orch, back pointer-Rotation, etc.

Radium storage-Radium handling-loading, transportation.

Medical diathermy, surgical diathermy, U.V., wave therapy, infrared therapy.

RECORD KEEPING

1. Introduction to theory of medical record science-History of medical records, definition of medical record, characteristics of good medical record.

Basic and other special medical record forms arrangement of medical record forms, medical record forms in hospital management, forms control programme-standardisation of forms.

Values of good medical record-Indexes.

Identification of patients.

2. Intensive training in :

- (i) Related to theory above
- (ii) Central admitting and enquiry services
- (iii) Accident and emergency cases
- (iv) Assembly of records
- (v) Census collection and compilation

3. Registration of special techniques and statistical analysis of same.

—Registration of therapy patient, registration of radiation reaction during treatment, maintenance of records-Cardex system-Statistical analysis-international coding-cancer registry.

Entries in fluoroscopy and skiagram books, stock maintenance, indenting, cross variation-statistical analysis Recording Radiographic reports-filling of instruction manuals-time schedules maintenance of M.L.C. films and records.

—Developing.

MEDICAL PHOTOGRAPHY

1. The Fundamental of the Photographic process.

2. Light, sensitive salts of Silver-nature of the photographic emulsion gelatine as a suspending medium and sensitiser glass. Cellulose and paper as the base-formation of the latent image on exposure need for chemical development brief outline of the meaning and significance of reciprocity intermitteny grain, resolution, irradiation, halation.

3 *X-Ray films and papers*.—Types of base i.e. cellulose nitrate and acetate, clear translucent, tinted-substratum coating-reason for double coating-antiabrasive, super-coating-characteristics of the screen and non screen types of films-dental films X-Ray negative paper-storage of unexposed X-Ray films-storage of processed films.

4. *Intensifying screens*.—Fluorescence-applications of fluorescent in radiography-construction of an intensifying screen-types of the intensifying screen-intensifying factor-cleaning of screens-mounting of screen-general care of screens. The X-Ray cassette. Testing a

cassette for proving good screen contact, general care of cassettes.

5. *Developers and development*.—Main constituents of an X-Ray developer, i.e. developing agents alkali or accelerator, preservative and restrainer-effects of temperature on development rate-standard development exhaustion of a developer-replenishment or other means of compensation for exhaustion.

6. *Fixes and Fixing*.—Fixing agents acid and preservative in a fixer inclusion of hardening agent-time of fixation exhaustion of a fixer.

7. *Rinsing washing and drying*.—Objects of rinsing-objects of washing-methods of washing-methods of drying films.

8. Dish processing-tank processing-processing in handgears-eare hangers-control of temperature by heating element and thermostat immersion heater, by water mixer, by refrigeration, by use of ice.

9. Reduction and Intensification.

10. Chemistry and characteristics of Farmer's reducer-Ammonium trisulphate, reducer-chromium intensifier.

11. *Preparation of Photographic Solution*.—Suitable water supply nature of mixing vessels-order of mixing special solutions-filtration making stock-solution making percentage solutions-storage of dry chemicals-storage of solutions.

ANNEXURE 12 / D / 2

VOCATIONAL COURSE

PHYSIOTHERAPY

1. Introduction to practice of physio therapy.
2. Survey of physio therapy including history of organization.
3. Diseases, Disabilities and Ethics of treatment.
4. Electro therapy—techniques of application of D.C. modified and unmodified Ionisation Technique of application of A.C. sinusoidal, faradic and other currents.
5. Therapeutic uses. Conditions suitable for treatment and contra indications.
6. Reaction of degeneration of muscles: normal reaction, reaction of complete and incomplete denervation, absence of reactions in absolute degeneration.

7. Therapeutic uses and technique of application of high frequency currents.

8. Types of electrodes in common use including condensers cable electrodes of short wave therapy.

9. Techniques of application of ultra violet and infra red irradiation : Condition suitable for treatment—contraindication—precautions against accidents—treatment in such cases of lapses.

10. Kinesiology. Functional anatomy and biomechanics in normal and abnormal conditions of extremities, back, neck, and thorax. Dynamics of human body movements and motor skills.

11. Principles of hydrotherapy: Whirl pool bath—vibra bath, contrast bath, Hotpacks, paraffin baths.

12. Physiology of heat and its various applications. Principles of massage in health & disease—physiology of massage, modes, techniques, sonic, vibratory massage beneficial effects.

13. Therapeutic Exercises. Principles, methods and physical effects. Rationale and technique and facilitating responses, desired in performance of exercises.

14. Principles and methods of manual muscle testing function testing sensory testing, electro-diagnostic testing like B.D. Chromax strength frequency curves and electro-myogram.

15. Locomotor rehabilitation.

16. Technique of gait training, Crutch Walking. Wheel chair activity.

17. Orthotics and prosthetics—Principles of making application of braces (long or short leg brace) Care of Braces and splints.

Special exercises: Pelvic floor exercises

Abdominal exercises

Low back exercises Foot

& Knee exercises

Shoulder exercises

18. Postural drainage.

19. Burger's exercises.

20. Frankel's exercises.

21. Windmill sitting exercises.

22. Treadmill, sitting exercises.

23. Madcat sitting exercises.

24. Friendly soul exercises.

25. Rehabilitation of Cardiac patients.

26. Activities of daily living.

27. Goniometry.

28. Ambulation and transfers.

ORTHOPAEDICS

1. Fractures—Different kinds. Healing, pre and post operative case.

2. Spine, congenital defects. Infectrons, Principles of treatment of acute stage.

3. Physical conditioning towards rehabilitation.

4 Diseases of joints, post-operative care.

5. Amputation, Orthoplastics, Arthodiosis, Muscle, transplantation.

6. Degenerative conditions and Metabolic disorders of bones.

7. Deformities of the spine and feet.

DERMATOLOGY

1. Skin diseases requiring physio therapy, scleroderma, psoriasis. Bed sores, eczema, Chronic ulcers, Skin grafts, repairs etc.

2. Electro thermo therapy for skin conditions like warts, corns, collositem, collosities, Pigen-tary defects, vitiligo alopecia.

PEDIATRICS

1. Poliomyelitis.

2. Cerebral Palsy.

3. Congential Deformities.

4. Encephalopathy.

5. Meningitis.

6. **Rickets.**

ANNEXURE 12/D/3

VOCATIONAL COURSE

HOSPITAL HOUSE KEEPING

1. *Hospital premises.*—Wards, OPD, OT, High risk areas, laboratories, ancillary services.

2. *Hospital infection.*—Cross infection, environmental infection, causative micro-organisms, modes of spread, service, micro-organism relationship.

2.1 Hospital infection control committee, constitution^ duties, control programmes, surveillance of hospital practices. educational programmes for hospital personnel.

3. *Sterilisation.*—Definition, methods of sterilisation, heat sterilisers, testing Of autoclav-ing •process, cooler sterilisers for sensitive materials, chemical sterilants.

4. *Cleaning of hospitals.*—Dust control, control of insects, care with water, cleaning of

floors, O.Ts., high risk areas, use of chemical disinfectants, cleaning drains, sinks, toilets. Disposal of patients excretions.

5. *Laundry.*—Equipment, upkeep, practices, collection, distribution.

6. *Kitchen.*—Equipment, cleanliness, food preparation, food distribution.

7. *Aseptic practices.*—In OT, wards, OPD laboratories, Central Sterile Supplies Department—equipment, practices, collection, distribution.

8. *Disinfectants.*—Types, uses, disinfectants policy.

9. Hospital records and statistics.

ANNEXURE 12/D/5
VOCATIONAL COURSE
OPTICAL TECHNICIAN

I. Anatomy & Physiology

1. Human Anatomy with special reference to Eye & cranial nerves.
2. Bony Orbit and ocular adnxa including lid & lacrimal system.
3. Ocular muscles-.
4. Gross Anatomy of coals of eye ball (Cornea, Sclera, Uvea, Retina, Lens & Vitreous),
5. Physiology of vision including colour vision.
6. Ocular movements & Binocular vision including accommodation. & convergence,
7. Formation & circulation of aqueous.
8. Physiology of Transparent structures of eye.

II. Vision Testing

1. Various components of vision, Light sense, form sense & colour sense.
2. Principle of testing for visual acuity & distant Vision, near vision.
3. Colour vision (Ishihara).

III. Geometrical & Physiological Optics

1. Optics of human eye and refractive errors.
2. Myopia, hypermetropia & its correction.
3. Aphakia & its correction.
4. Presbyopia & its correction.
5. Astigmatism & its correction.
- 6.. Measurement of IPD, fitting and adjustments of spectacles including centering.
7. Types of lenses usually prescribed.
8. Aberrations in the Human Eye.

IV. Optics

1. Laws of reflection, refraction as applied to eye.
2. Optical imagery in mirrors & in lenses.
3. Cardinal points & planes of lenses.
4. Magnifying of power in optical system of lenses.
5. Various types of lenses (Spherical).
6. Cylindrical lenses.
- 7- Bifocals and multi-focus
8. Ophthalmic prisms nomenclature, uses and their effects.
9. Aspherical lenses and special lenses
10. Ophthalmic glass.
11. Transmission density of refracting glasses.

12. Grinding materials.
13. Tools and gadgets and their testing,
14. Aberration of Ophthalmic lenses.
15. Fabrication of various types of spectacle lenses.
16. Ophthalmic plastic lenses.

PRACTICALS

1. Introduction to glass material for grinding and machinery.
2. Grinding of spherical low medium, high minus glasses.
3. Grinding of spherical low medium high plus glasses.
4. Grinding of cylindrical & spherocylindrical glasses.
5. Bifocals grinding.
6. Prism prescription & fitting of glasses incorporating prisms.
7. Verification of fabricated lens surfaces & power.
8. Lens orientation, marking & cutting.
9. Lens edging and fitting,
- 10; Verification of prescription and adjustment.
11. Fitting of glasses on race.
12. Post fitting possible adjustments.

PRACTICAL TRAINING ON THE JOB

Candidate must keep a diary of his work during the job indicating his work.

1. Visual acuity testing for distance & Near.
2. Identification of lenses (Spherical, Cylindrical, spherocylinders & Prisms) by Lensoinetry.
3. Finding out the centering of the glasses.
4. Checking the prescription of glasses & transportation of lenses.
5. Measurements for making of spectacles and verification of inter pupillary distance.
6. Making (Grinding, edging) of spheres, cylinders, spherocylinders & various types of bifocals.

ANNEXURE 12\DV5
VOCATIONAL COURSE
SANITARY INSPECTOR

1. *FIRST AID*.—Curriculum same as of St. John Ambulance Association.
2. *Elements of Entomology*
Insects—Housefly, louse, ticks, sandfly, rat flea, bed bugs, mosquitoes— disease transmitted, control measures.
3. *Elements of climatology*
Effects of climate on health
Prevention of effects of cold and hot climates.
4. *Vital Statistics*
Definition, sources of health statistics, morbidity and mortality rates International classification of diseases.
5. *Personal hygiene*
Hygiene and healthful living Health habits and practices Physical health in the home.
6. *Nutrition*
Definition, relation of nutrition to health Body building, energy yielding foods Nutrients—Carbohydrates, proteins, fats Vitamins Minerals
Nutritive value of foods Balanced diet
Preparation and preservation of foods
Malnutrition—factors, deficiency diseases, management.
7. *Environmental sanitation*
Basic sanitation-rural and urban water supply-storage, prevention of contamination, treatment, water supply plants, chlorination. Methods of Softening.
Waste and Waste Disposal
Kinds of wastes, sources, collection, removal, composting, manure-pits incineration
Garbage and refuse disposal
Elementary plumbing
Excreta disposal
Rural—sanitary latrines—construction and maintenance
Urban—septic tanks, aqua privy, disposal problems
Disposal of the dead
Housing—inspection of plumbing
Air and ventilation
Industries, trades, hygiene
School sanitation
- Fairs, festivals and Public gatherings
Public health measures, water supply, sanitation, control of communicable diseases
Disinfection—Physical, chemical, gaseous
Public health engineering
Rodent control. Vermin and rodent proof construction mosquito control
Reports—preparation of health services in Community reports Malaria survey, Filaria survey, Leprosy survey, TB survey. School survey.
Food Sanitation—Disease transmitted through food
Food catering and dealing establishments
Infection slaughter houses, vegetable, fish and meat markets, dairies, restaurants.
8. *Control of Communicable Diseases*
Various diseases, disease, agents, sources and reservoirs, modes of transmission. channels of infection, susceptible hosts.
Isolation, quarantine, surveillance.
Systematic diseases—air borne, water borne, insect borne, zoonoses, contagious diseases
Control—reservoirs sources, transmission chemoprophylaxis, immunisation.
Universal immunisation programme.
9. *Public Health Administration*
Central, State and local organisations. Public health laboratories International and voluntary agencies
Community centres School health scheme
10. *Industrial health*
Inspection—Factory sanitation Accidents and prevention Factory act and rules.
11. *Health Education*
Communication skills and audiovisual aids
12. *Maternal, child and Family Welfare.*
Antenatal services, labour, postpartal services.
Care of children—immunisation Population control programme National MCH programme.

Annexure 12/D/6
Vocational Course
LABORATORY TECHNOLOGY

CLINICAL PATHOLOGY: (Theory & Practical)

1. Microscopy of urine.
2. Physical and Microscopy of saliva.
— Reaction, albumin, amylase in saliva.
3. Physical and Microscopy of sputum
— Albumin and occult blood in sputum.
4. Microscopy examination of Faeces.
5. Semen : Sperm count and motility.
6. Microscopic examination of CSF.

HAEMATOLOGY (Theory & Practicals)

1. Blood-Definition, normal Constituents.
2. Collection of Blood samples for different estimations and apparatus used in Haematological study.
3. Haemopoiesis of all blood elements.
4. Red blood cells-characteristics, functions, normal values, counting of RBC's.
5. Haemoglobin-Methods of estimations, normal values, composition, function.
6. Anticoagulants-Uses, different anticoagulants used in different investigation.
7. Packed cell volume, definition, estimation, normal values.
8. Absolute Values — M.C.V., M.C.H.C., MCH.
9. White blood cells-description, function, normal values, total counting.
10. Preparation of thin and thick blood smears and staining of films, Interpretation of films.
11. Differential count, abnormal leucocytes.
12. Reticulocyte counting.
13. Estimation of E.S.R.
14. Investigation of Bleeding disorders-P.T., B.T., C.T. Clot retraction time, osmotic fragility test.
15. Platelet count.
16. Test for sex chromatin.
17. Method of aspirating bone marrow and preparation of smear and staining.

BLOOD BANK (Theory & Practicals)

1. Historical sketch.
2. Various blood group systems.
3. ABH Blood group systems and other blood group systems.
4. Occurrence of natural antibodies in the ABH system.
5. Rho (D) typing.
6. Cross matching.
7. Blood transfusion procedure.
8. The complications of blood transfusion.
9. Prophylactic measures against blood transfusion hazards.
10. Haemolytic diseases of new born and exchange transfusions.
11. (a) Selection of Donor, (b) Collection of blood, (c) Blood storage and anticoagulants.
12. Whole blood and various types and fractions.
13. Antihuman globulin test. Direct and Indirect.
14. Organisation, operation and administration of a blood bank.

BIO-CHEMISTRY (Theory & Practicals)

1. *Cleaning of glass wares.*—Elements, compounds-Structures of atom-Valency-Symbols-radicals and ions-Atomic and molecular weight-acids, bases, buffers-equivalent weights-strength of acids, bases-hydrogen ion concentration-pH scale of biological fluids-indicators.

Theory of titrations-Acid base titrations, concept $V_1N_1 = V_2N_2$. Primary standards-exact normal solutions.

2. *Urine.*—Methods of analysis-physical and chemical-reaction-total acidity estimation-proteins, albumin (heat and acetic acids, sulphosalicylic-Esbach tests)-Bence-Jones protein-blood-glucose-benedicts quantitative and qualitative-galactose-Lactose pentoses-tyrosine-ketones-bilirubin-Bile salts. Urobilinogen, porphobilinogen-Melanin, homogentisic acid-Phenyl-Pyruvic acid-chlorides, Calcium-Creatinine-Urea-Uric acid diastase.

3. *Gastric Contents* :—Collection, physical examination-chemical examination-total and free, acidity-starch-blood-bile-pepsin.

4. *Cahrimetrx and Photometry* —Blood collection anti-coagulants preparation of protein free filtrates.

5. *Methods of examination of CSF*:—(Sugar, chlorides, proteins) blood urea-and urea aitrogen-uric acid-creatinine-glucose-Inorganic phosphorous-flame photometry (Demonstration only).

6. *Liver function tests-total protein, albumin blobulin ratio-cholesterol*:—bilirubin-phosphates—transaminases-serum analase. GTT-Urea clearance tests.

7. *Blood* .—Collection of blood—Deter-urination of urea, non protein nitrogen-Creatinine—Uric acid—Glucose—Potassium. Sodium, Calcium.

HISTOPATHOLOGY & CYTOPATHOLOGY **(Theory & Practical)**

1. General principle of Histopathological work.
2. Collection of specimens and numbering and giving tissue bits.
3. Museum technology-Storage of specimens, principles of mounting specimens.
4. Preparation of various fixatives, their merits and demerits.
5. Paraffin embedding procedure-processing of tissue both by hand and by the use of Auto technicon.
6. Decalification of bone prior to preparing paraffin blocks.
7. Preparation of various stains and Histo-pathological fixatives.
8. Dehydration, clearing and staining of sections by routine and special stains.
9. Section cutting, different micretones in use, cure of knives, errors in section cutting.
10. Cytopathology-Cytological Techniques-preparation of fixative stains-Papani-colau's stains, H and T.
11. Buccal smears.
12. Proficiency in the use of different machinery.
13. Staining-theory of staining, staining reactions, sources of dyes.
14. Cell block preparation.
15. Frozen section, Cryostaf use.
16. Histochemical fixatives,

Bacteriology & immunology

(theory & Practicals)

1 Methods of collection and handing specimens for bacteriological study:

1. Blood
 2. Urine
 3. Throat Swab
 4. Sputum
 5. Miscellaneous exudates.
2. Sterilisation.
 3. Culture Media.
 4. General Bacteriology :
 1. Staining
 2. Morphology Structure of bacteria
 3. Principles of immunology
 4. Antigen and antibody
 5. Antigen and antibody reaction:
 - (1) Agglutination
 - (2) Precipitation
 - (3) Complement fixation.

5. *Diagnostic Bacteriological methods*:

Laboratory diagnosis of the following :

- (a) Staphylococci
 - (b) Streptococci
 - (c) Pneumococci
 - (d) Neisseria — Meningococci
Gonococci
 - (e) Salmonella
 - (f) Shigella
6. Methods for Bacteriological analysis of mtlk.
 7. Bacteriological examination of water.
 8. Antibiotic sensitivity test.
 9. Laboratory diagnosis of:
 - (a) Candida albicans.
 - (b) Skin scraping and microscopy of fungal infections, viz.
 1. Taenia infections.
 - (c) Slit smear for Hansens bacilli.

PARASITOLOGY (Theory & Practical)

1. Life Cycle of :
 - (a) Entamoaba histolytica
 - (b) Haemoflagellates
 - (c) Malaria parasite
 - (d) Tape worm
 - (e) Round worm, hook worm
 - (f) Microfilaria
2. Methods for the parasitologic examination of the faeces.
3. Methods for parasitologic examination of the blood.

ANNEXURE 12/D/7
VOCATIONAL COURSE
MULTIPURPOSE HEALTH WORKERS
(FEMALE)

1. Hygiene

Introduction to hygiene and healthful living concepts of health and disease.
Health habits and practices.
Physical health.
Periodic health examination.
Health in the home.
Mental hygiene and health.

2. Nutrition

Definition, relation of nutrition to health.
Body building, energy yielding and protective foods.
Nutrients — carbohydrates, proteins, fats, vitamins.
Minerals.
Nutritive value of foods. Balanced diet. Preparation and preservation of foods.
Malnutrition — factors. Deficiency diseases, management.

3. Fundamentals of Nursing

A. Introduction to Nursing

Nursing as health and community service.
Responsibility of health workers, ethics. Health team.
Organisation of health and nursing services organisation in home, health centres, clinics schools, hospitals.
Records and reports.
Maintenance of supplies, equipments.

B. Nursing Procedures and Techniques

Care of skin, hair, hands, eyes, mouth.
Nutrition.
Exercises.
Observation and examination — Temperature, pulse, BP, weight, height, history, urine analysis, collection of specimens, diagnostic procedures.
Aseptic procedures — infections, preparation for operation, sterilization and, disinfection.
Medication and Therapies — oral, injections, local applications. ;
Basic nursing care of patients.

C. First-aid and Emergency Nursing

Prevention of accidents — health education.
Injuries to bones and joints.
Wounds and haemorrhages.
Poisons, bites, stings foreign bodies.
Loss of consciousness, asphyxia, heat shock.
Thermal, chemical-injuries, burns.
Electric shock.

D. Child Health

Growth and development of child. Newborn — care. Protection — Immunisation.

E. Maternal Health

Antenatal care — Maternal Health Care services. Rural and Urban centres.

F. Family Health and Community Health

Family health care — Home visits.
Community health.
Environmental health and sanitation.
School health services.
Role of health worker in community.

4. Community Health Nursing

A. Domiciliary midwifery

Surveys, detecting pregnant women, antenatal care.
Conducting Delivery at home.
Post partal care.

B. Midwifery and maternity nursing

Pregnancy, labour, puerperium complications of pregnancy, labour, puerperium.
Training of community workers and Dais.

C. Family Planning and Welfare

National Family Welfare programme.
Family Planning methods.

D. Nutrition Education

E. Health Education

F. Communication skills and audiovisual aids'

- G. *Basic Medicine and Pharmacology*
Home nursing, elementary care, treatment of minor ailments.
- H. *Health problems and plans*
National plans — Role of Health worker.
- I. *Communicable diseases*
Control, Immunisation.
- J. *Mental diseases.*

K. *Environmental Sanitation*

Basic sanitation — rural and urban. Safe water supply.

K. Environmental Sanitation

Basic sanitation – rural and urban

Safe water supply

Sanitary disposal of excreta, water, refuse.

Venereal diseases.

Sanitation in fairs, festivals, disasters.

L. *Health statistics.*

ANNEXURE 12/D/8

VOCATIONAL COURSE

MUTIPURPOSE HEALTH WORKERS (MALE)

1. First Aid

Curriculum same as of St. John Ambulance Association.

2. Elements of Entomology

Insects — Housefly, louse, ticks, sand-fly, rat flea, bed bugs, mosquitoes — disease transmitted, control measures.

3. Elements of climatology

Effects of climate on health.

Prevention of effects of cold and hot climates.

4. Vital Statistics

Definition, sources of health statistics, morbidity and mortality rates. International classification of diseases.

5. Personal hygiene

Hygiene and healthful living. Health habits and practices. "Physical health

Health in the home.

6. Nutrition

Definition, relation of nutrition to health.

Body building, energy yielding foods.

Nutrients — Carbohydrates, proteins, fats.

Vitamins.

Minerals.

Nutritive value of foods.

Balanced diet.

Preparation and preservation of foods.

Malnutrition — factors, deficiency diseases, management.

7. Environmental sanitation

Basic sanitation — rural and urban water supply — storage, prevention of contamination, treatment, water supply plants, chlorination. Methods of Softening.

Waste and Waste Disposal — Kinds of wastes, sources, collection, removal composting, manure-pits incineration.

Garbage and refuse disposal. Elementary plumbing. Exereta disposal.

Rural — sanitary latrines — construction and maintenance.

Urban — septic tanks, aqua privy, disposal problems.

Disposal of the dead.

Housing — inspection of plumbing — Air and ventilation.

Industries, trades, hygiene.

School sanitation,

Fairs, festivals and Public gatherings — public health measures., water supply, sanitation, control of communicable diseases.

Disinfection — Physical, chemical, gaseous. Public health engineering.

Rodent control. Vermin and rodent proof construction — mosquito control.

Reports — preparation of health services in Community reports.

Malaria survey, Filariasis survey, Leprosy survey, TB survey, School survey..

Food Sanitation — Disease transmitted through food.

Food catering and dealing establishments.

Inspection slaughter houses, vegetable, fish and meat markets. dairies, restaurants.

8. Control of Communicable Diseases

Various diseases, disease agents, sources and reservoirs, modes of transmission, channels of infection, susceptible hosts. Isolation, quarantine, surveillance.

Systematic diseases — air borne, water borne, Community centres.

Control — reservoirs sources, transmission chemoprophylaxis, immunisation.

Universal immunisation programme.

9. Public Health Administration

Central, State and local organisations. Public health laboratories. International and voluntary agencies. Community centres. School health scheme.

10. Industrial health

Inspection — Factory sanitation.

Accidents and prevention. Factory act and rules.

11. Health Education

Communication skills and audiovisual aids.

12. Maternal, child and Family Welfare

Antenatal services, labour, postpartal services.

Care of children — immunisation. Population control programme. National MCH programme.

13. National Health Programmes — Role of M.P-W.

National malaria eradication programme.

National filaria control programme. National

leprosy eradication programme. National

tuberculosis control programme. National

programme of control of blindness. National

goitre control programme.

ANNEXURE 12/D/9

VOCATIONAL COURSE

DENTAL HYGIENIST

1. Dental Anatomy

Elementary knowledge of development of the jaws and teeth. Structure, nomenclature and morphology of

human teeth Eruption, re-sorption and occlusion of teeth. Relationship of teeth with investing tissues. Muscles of mastication and facial expression. Temporo-mandibular Articulation. Course and distribution of V and VII. Cranial nerves.

2. Physiology

Brief description of the histology and function of various dental and oral tissues e.g. Gingiva, Periodontal membrane. Alveolar process, Cementum, Enamel, Dentine, Pulp membrane, pulp etc.

Salivary glands, ducts and their functions. Composition and function of Saliva.

Mastication, deglutition and phonation.

3. Materia Medica, General & Dental

Brief description, nomenclature, derivation, dosage, pharmacological action and therapeutic uses of drugs commonly used in dentistry.

Practical

Preparation of gum paints, mouth washes & dentifrices.

4. Dental Pathology & Bacteriology

Dental Anomalies.

Abrasion and Erosion, Accretions.

Oral manifestation of systemic diseases, like diabetes, syphilis, anaemia, vitamin deficiencies and infectious diseases.

Neoplasm with reference to oral cavity.

Brief description of Pathology and Bacteriology of dental caries and gingival affections.

5. Dental Radiology

Fundamental and elementary principle of dental Radiology
Technical aspects of Dental Radiographs i.e. the taking, processing and mounting of Dental Radiographs.

Practical

Taking, processing and mounting of Dental Radiographs.
Radiation hazards.

6. Dental Hygiene and oral Prophylaxis

Definition of Hygiene.
Objectives of Dental Hygiene.
Oral Prophylaxis – Various methods
Stains on teeth — extrinsic, intrinsic and their management.

Dental plaque.
Dental calculus

Brief description and the role of Oral Prophylaxis in Gingivitis, periodontitis, periodontal and alveolar abscess, stomatitis, gingivitis and paradontosis.

Clinical

Instruments, technique of oral Prophylaxis
destaining and polishing of teeth.
Topical application of fluorides.
Care of oral cavity and appliances during treatment of maxillo-facial cases.

7. Office Assistance, Practice Management, Book Keeping and Typing.

General office routine, economics, book Keeping Typing establishment in private practice, record-keeping, services rendered and its financial aspects. Professional referrals.

8. Dental Health Education, Social and Public Health Dentistry

Definition of and Dental Health. Aims and Objects Of Dental health Education. Dental Health and Children.
(Ante and post- natal), infants, preschools Children and grownups. Handicapped children.
Dental caries – Prevalence and prevention.
Periodontal Diseases.
Saliva in relation to dental health and disease.
Diet habits and dental health.
Oral Cancer.

Brief outline of historical background Of Public Health, History of dentistry and Public Health Services. Dental Health Team in relation. to Community health.

Practical

Preparation of models of jaws and teeth – normal and pathological dental conditions.
Designing, drawing and painting of posters on dental health education.
Procedure for arranging short talks, dramas and features on dental and oral health. Visual aids.

9. Operating Room Technique and Chair-side Assistance (Lectures and Practicals)

Reception of patients.
Lay-out of Reception Room.
Conversant with lay out of Dental Surgery and Hygienists Clinic.
Chair side assistance and technique.
Clinical/Operating Room Technique.
Local anaesthetic and equipment.
Methods of sterilisation and care of dental instruments.
Basic principles in surgery.
The use of instruments in dental practice.
Examination and charting of teeth, gingivi, oral cavity.
Instruction to patients and recalls.

10. Dental Ethics, Jurisprudence and Orientation in Dentistry (Theory and Practical)

Dentists Act, 1948, as it relates to registration of Dental Hygienists and Dentists.
Legal impositions in relation to dental practice, Code of Ethics.
Place and function of dental profession in the society and discussion of economic problems involved therein.
Social factors in Dental progress, income and living standard of people.
Objective and scope of dentistry.
Dental specialties.

11. Dental Materials (Theory & Practicals)

General knowledge of various materials used in Dentistry as impression materials, gypsum products, waxes, investing materials and various filling materials — Temporary and Permanent,

PHARMACIST**PHARMACEUTICS****A. Dosage Forms**

- 1.. Physical properties of drugs influencing design of dosage forms.
2. Chemical characteristics of drugs versus formulation.
3. Absorption,distribution, biotransformation.
4. Additives in dosages forms as exemplified by surfactants hydrocolloids, diluents, vehicles, bases, stabilisers, preservatives, coloring agents, flavouring agents, sweetening.
5. Monophasic liquid dosage forms, techniques of enhancing solubilities of drugs in vehicles, other problems involved in preparation and stability of liquids. Review of different types of monophasic liquids forms as illustrated by liquids for internal use, lotions, sprays, inhalations, eye lotions and eye drops, ear drops, nasal drops, throat paint etc.
6. Biphasic liquid dosage forms:
Emulsions and suspensions.
Emulsions-types, identification, selection of emylgents, preparation and stability.
Suspensions—Flocculated and non-flocculated suspensions, selection of wetting, suspending and dispersing agents, preparation and stability.
7. Semisolid dosage forms (ointments and suppositories)Ointments—Ointment bases factors governing selection of ideal base, preparation of ointments, creams, jellies etc. Stability of packaging.
Suppositories—Suppository bases, selection of ideal base, preparation of suppositories, problems of stability and packing.
8. Solid dosage; forms (Bulk and Unit dosage forms)
Bulk—Powders, incorporation of different ingredients, preparation of different varieties of powders such as powders for internal use effervescent powders, dusting powders, snuffs, dentifrices, etc.
Tablets—Soluble tablets, effervescent tablets, lozenge tablets, suppository tablets, hypodermic tablets.
Capsules—Hard and soft gelatin capsules.

9. Parenteral Preparations.

10. Sustained Action dosage forms.

B. Dispensing

Prescription- Reading and understanding of prescriptions, Latin terms commonly used, calculations involved in dispensing of some typical preparations, conversions of metric quantities to imperial system and vice versa.
Incompatibilities in prescriptions.
Physical, Chemical and Therapeutical.
Posology.

C. Hospital Pharmacy

1. Hospital Pharmacy — Definition and functions, Organisation.
2. Outpatient Department.
3. Inpatient Department.
4. Medical Stores.
5. Licensing procedure for procuring and stocking of alcohol and narcotics, sampling for quality control.

D. Industrial Pharmacy

1. Article size reduction.
2. Mixing and Homogenisation
3. Filtration.
4. Heat processes — evaporation, desiccation, distillation, sublimation, freeze drying etc.
5. Extraction processes — Maceration, Percolation, Soxhlation etc.
6. Methods of sterilization.
7. Processing of tablets.
8. Processing of capsules.
9. Processing of parenteral products.
10. Concept of imunisation vaccines, sera, toxoids.
11. Containers and closures inclusive of aerosol packaging.

Pharmaceutical Chemistry

1. Pharmacoposial monograph of drug, tests for purity, sources of impurities in Pharmacoposial substances, official limit and quantitative tests.

2. An elementary study of inorganic pharmacoposial substances with sufficient emphasis on general properties and stability, storage conditions, uses and pharmaceutical preparations of important inorganic medicinal agents including radio-pharmaceuticals and pharmaceutical aids.
3. As regards the assay procedures, the following substances will be covered:
Ammoniated mercury, Boric acid, Sodium oxalate, Sodium bicarbonate, Ferrous sulphate, Hydrogen peroxide, Potassium permanganate, Antimony potassium tartrate, Chlorinated lime, Copper sulphate, Iodine, Sodium chloride, Bismuth oxychloride, Yellow mercuric oxalate, Ammonium chloride, Magnesium sulphate, Zinc sulphate, calcium gluconate.
4. An introduction to nomenclature of organic chemical systems with particular reference to heterocyclics.

Forensic Pharmacy and Ethics

1. The Drugs and Cosmetics Act, 1940 and the Rules made thereunder.
2. The Dangerous Drugs Act, 1930.
3. The Pharmacy Act, 1948.
4. The Drugs and Magic Remedies (Objectionable Advertisements) Act, 1954.
5. The Medicinal and Toilet Preparations (excise Duties) Act, 1954.
6. The Drugs (Prices Control) Order, 1979
7. The Shops Act of the State.
8. The Drugs (Prices Control) Order, 1979.
9. The Medical Termination of Pregnancy.
10. The Poisons Act, 1919.
11. The Prevention of Cruelty to Animals Act.
12. The Insecticides Act.
13. The code of Pharmaceutical Ethics framed by Pharmacy Council of India.

Pharmacognosy

1. Definition, history and scope of Pharmacognosy.
2. Pharmaceutical aids derived from plants and animals.
3. Official methods of drug evaluation.
4. Study of the important diagnostic features of the following:
 - (a) Honey, starch, acacia, tragacanth, agar inpaghula, pecting guar gum and bael.

- (b) Digitalis, urguinea, senna, aloes, rhubarb, glycyrrhiza, Dioscorea, mustard, bitter almond, artemesia and cantharides, chrysarobin, kalmegh, picorrhiza, psoralen, pyrothium and quilinia.
- (c) Arachis oil, castor, oil linsced, shark liver oil, kokum butter, lanolin and bee-swax, chaalmogra oil and sesame oil.
- (d) Umbelliferous fruits, lemongrass oil, lemon peel, nutmeg, cloves, cinnamon, eucalyptus, menthol, camphor, and tur-pentine oil, saus-surca, cardamom, cas-sia, chenopodium oil, dill, jatamansi, fresh lemon peel, mentha oil, fresh and dried orange peel, rasna and turmeric.
- (e) Ginger, podyphyllum resin, benzoin, storax, capsicum, resin, balsam of tely and male fern, cannabis, tar, myrrh and asafoetida.
- (f) Tannin acid and black catechu, Myrobalan and asoka bark.
- (g) Lobelia, solaneceous drugs, cocaine, elnehona, opium, ipecacuanha, ranwolfia vinca, nuxvomica, ergot, phys-ostigma, aconite, ephedra, -coichicum and kurchi, aswagandha, chirata, vale-rian, vasaka, punarnava and vidaug.
- (h) Amla, kapur, kachari, kesar, gokhru, pipal babchi, bahera, brahmi, satavari, lebsum vaj, shankhpushi, arjun, tulsi, pudina and benatsha.
5. Study of surgical fibres, sutures dressings.

Pharmacology

- I. Scope of Pharmacology.
- II. Routes of administration of drugs.
- III. Disposition of drugs.
- IV. General mechanism of drug action.
- V. Basic principles and importance of drug interactions.
- VI. Pharmacological classification of drugs:

1. *Drugs action on the central nervous system*

- (i) General anaesthetics.
- (ii) Narcotic analgesics.
- (iii) Centrally acting muscle relaxations and antiparkinsonism agents.
- (iv) Drug dependence and abuses of drugs.
- (v) Management of poisoning

2. Local anaesthetics

3. *Drug acting on autonomic nervous system:*

Cholinergic drugs, anticholinergic drugs, Symptoms and treatment of solanaceous drugs poisoning. Choline esterase inhibitors, symptoms and treatment of insecticide poisoning. Sympathomimetic amines, adrenergic receptor blockers, neurone blockers and ganglion blockers.

Drugs used in myasthenia gravis and neuromuscular blockers.

4 Drugs acting on eye.

5. Drugs acting on Respiratory system.

6. Physiological role of histamine and serotonin.

7. Cardiovascular drugs.

8. Drugs action on the Blood and the Blood forming organs.

9. Drugs affecting renal function—Diuretics.

10. Hormones and Hormone antagonist—Hypoglycaemic agents, antithyroid drugs, sex-hormones and oral contraceptives.

11. Drugs action on digestive system.

12. Heavy metals and metal antagonist.

13. Chemotherapy of microbial diseases.

14. Chemotherapy of protozoal diseases.

15. Chemotherapy of cancer.

ANNEXURE 12/E

Job Descriptions

JOB RESPONSIBILITIES OF HEALTH WORKER (FEMALE)

Note: Under the multipurpose workers scheme, a Health Worker (Female) is expected to cover a population of 5000 (At present, however, she is expected to cover a population of 10,000 of which about 4000 will be her intensive area and the remaining will be the twilight area. In the intensive area, she will be responsible for all the activities listed and in the twilight area for maternal and child health activities only on request). She will carry out the following functions:—

I. Maternal and Child Health

1. Register and provide care to pregnant women throughout the period of pregnancy.
2. Test Urine of pregnant women for albumen and sugar and estimate haemoglobin level during her home visits and at the clinic.
3. Refer cases of abnormal pregnancy and cases with medical and gynaecological problems to the Health Assistant (Female) or the Primary Health Centre.
4. Conduct about 50% of total deliveries in her intensive area and whenever called in the twilight area.
5. Supervise deliveries conducted by dais and assist them whenever called in,
6. Refer cases of difficult labour and newborns with abnormalities and help them to get institutional care and provide fol-

low up care to patients referred to or discharged from hospital.

7. Make at least three postnatal visits for each delivery conducted in the intensive area and render advice regarding care of the mother and care and feeding of the newborn.
8. Assess the growth and development of the infant and take any necessary action.
9. Help the Medical Officer and Health Assistant (Female) in conducting MCH and family planning clinics at the subcentre.
10. Educate mothers individually and in groups in better family health including MCH, family planning, nutrition, immunization, control of communicable diseases, personal and environmental hygiene and care of minor ailments.

II. Family Planning

1. Utilize the information from the Eligible Couple Register for the family planning programme.
2. Spread the message of family planning to the couples and motivate them for family planning individually and in groups.
3. Distribute conventional contraceptives to the couples, provide facilities and help to prospective acceptors in getting family planning services, if necessary, by accompanying them or arranging for the dai to accompany them to hospital.

4. Provide follow-up services to female family planning adopters, identify side-effects, give treatment on the spot for side-effects and minor complaints and refer those cases that need attention by the physician to the PHC/Hospital.
5. Establish female depot holders, help the Health Assistant (Female) in training them, and provide a continuous supply of conventional contraceptives to the depot holders.
6. Build rapport with acceptors, village leaders, dais and others and utilize them for promoting family welfare programmes.
7. Identify women leaders and help the Health Assistant (Female) to train them.
8. Participate in mahila mandal meetings, and utilize such gathering for educating women in family welfare programmes.

III. Medical Termination of Pregnancy

1. Identify the women requiring help for medical termination of pregnancy and refer them to the nearest approved institution.
2. Educate the community on the availability of services for medical termination of pregnancy.

IV. Nutrition

1. Identify cases of malnutrition among infants and young children (0 to 5 years), give the necessary treatment and advice and refer serious cases to the PHC.
2. Distribute iron and folic acid tablets as prescribed to pregnant and nursing mothers, infants and young children (0 to 5 years) and family planning acceptors.
3. Administer vitamin 'A' solution as prescribed to children from 1 to 5 years.
4. Educate the community about nutritious diet for mothers and children.

V. Communicable Diseases

1. Identify cases of notifiable diseases, i.e. cholera, smallpox, plague, poliomyelitis and persons with continued fever or prolonged cough, or spitting of blood, which she comes across during her home visits and notify the Health Worker (Male) about them.

VI. Immunization

1. Immunize pregnant women with tetanus toxoid.
2. Administer primary smallpox vaccination and BCG vaccination to all newborn infants, and DPT vaccination, oral

poliomyelitis vaccine (where available) and BCG vaccine (if not given at birth) to all infants (0 to 1 year).

VII. Dai's Training

1. List dais in the intensive and twilight areas and involve them in promoting family welfare.
2. Help the Health Assistant (Female) in the training programme of dais. (Also refer to 1.5 regarding supervision of dais).

VIII. Vital events

1. Record births and deaths occurring in the intensive area in the births and deaths register and report them to the Health Worker (Male).

IX. Record Keeping

1. Register (a) pregnant women from three months of pregnancy onwards; (b) infants, zero to one year of age; and (c) women aged 15 to 44 years; through systematic home visits in the intensive area and at the clinic.
2. Maintain the prenatal and maternity records and child care records.
3. Assist the Health Worker (Male) in preparing the Eligible Couple Register and maintaining it up-to-date.
4. Prepare and submit the prescribed periodical reports in time to the Health Assistant (Female).
5. Prepare and maintain maps and charts for her area and utilize them for planning her work.

X. Primary Medical Care

1. Provide treatment for minor ailments, provide first aid for accidents and emergencies and refer cases beyond her competence to the Primary Health Centre or nearest hospital.

XI. Team Activities

1. Attend and participate in staff meetings at Primary Health Centre, Community Development Block of both.
2. Coordinate her activities with the Health Worker (Male) and other health workers including the Community Health Volunteers and dais.
3. Meet with the Health Assistant (Female) each week and seek her advice and guidance whenever necessary.
4. Maintain the cleanliness of the sub-centre.
5. Participate as a member of the team in camps and campaigns.

JOB RESPONSIBILITIES OF HEALTH WORKER (MALE)

Note: Under the multipurpose workers scheme, a Health Worker (Male) is expected to cover a population of 5,000 wherein he will carry out the responsibilities assigned to him. (He will have different sets of responsibilities for MCH, Family Planning, Immunization and Nutrition in the intensive and twilight areas of the Health Worker (Female). The functions to be carried out only in the -twilight area are starred).

He will make a visit to each family once a month.

He will carry out the following functions:

I. Malaria

1. Identify fever cases.
2. Make thick and thin blood films of all fever cases.
3. Send the slides for laboratory examination.
4. Administer presumptive treatment to all fever cases.
5. Record the results of examination of blood films.
6. Refer all cases of positive blood films to the Health Assistant (Male) for radical treatment.
7. Educate the community on the importance of blood film examination for fever cases, treatment of fever cases, insecticidal spraying of houses, larviciding measures, and other measures to control the spread of malaria.

II. Communicable Diseases

1. Identify cases of notifiable diseases, i.e. cholera, smallpox, plague, poliomyelitis and persons with continued fever, or prolonged cough, or spitting of blood, which he comes across during his home visits and notify the Health Assistant (Male) and Primary Health Centre about them.
2. Carry out control measures until the arrival of Health Assistant (Male).
3. Educate the community about the importance of control and preventive measures against such communicable diseases including tuberculosis
4. Report the presence of stray dogs to the Health Assistant (Male)

III. Environmental Sanitation

1. Chlorinate public water sources including wells at regular intervals.
2. Educate the community on (a) the method of disposal of liquid wastes; (b) the method of disposal of solid wastes;

(c) home sanitation; (d) advantages and use of sanitary type of latrines; (e) construction and use of smokeless chulhas. 3. Help the community in the construction of (a) soakage pits; (b) kitchen gardens; (c) manure pits; (d) compost pits; (e) sanitary latrines.

IV. Immunization

1. In the intensive area, administer DPT vaccination, BCG vaccination and, wherever available, oral poliomyelitis vaccine to all children aged one to five years. (Also refer to 2.4 for smallpox vaccination.)
2. *In the twilight area, administer DPT vaccination, BCG vaccination and, wherever available, oral poliomyelitis vaccine to all children aged zero to five years. (Also refer to 2.5 for smallpox vaccination and to 8.3 for tetanus toxoid.)
3. Assist the Health Assistant (Male) in the school immunization programmes.
4. Educate the people in the community about the importance of immunization against the various communicable diseases.

V. Family Planning

1. Utilize the information from the Eligible Couple Register for the family planning programme.
2. Spread the message of family planning to the couples in his area and motivate them for family planning individually and in groups.
3. Distribute conventional contraceptive to the couples.
4. Provide facilities and help to prospective acceptors of vasectomy in obtaining the services.
5. Provide follow-up services to male family planning acceptors in the intensive area and *(all family planning acceptors in the twilight area), identify side-effects, give treatment on the spot for side-effects and minor complaints and refer those cases that need attention by the physician to the PHC/Hospital.
6. Build rapport with satisfied acceptors, village teachers and others and utilize them for promoting family welfare programmes
7. Establish male depot holders in the intensive area and *(male and female depot holders in the twilight area). Help the Health Assistant (Male) and Health Assistant (Female) in training them, and provide a continuous supply of conventional contraceptive to the depot holders.

8. Identify the male leaders in each village in the intensive area and * (the male and female leaders in the twilight area).
9. Assist the Health Assistant (Male) in training the leaders in the community, and in educating and involving the community in family welfare programmes.

VI Medical Termination of Pregnancy

1. *Identify the women in the twilight area requiring help for medical termination of pregnancy and refer them to the nearest approved institution.
2. Educate the community on the availability of services for medical termination of pregnancy.

VII. Maternal and Child Health (In the twilight area)

1. Identify and refer women with abnormal pregnancy to the Health Worker (Female).
2. Identify and refer women with medical and gynaecological problems to the Health Worker (Female).
3. Immunize pregnant women with tetanus toxoid.
4. Refer cases of difficult labour and new borns with abnormalities to the Health Worker (Female).
5. Educate the community about the availability of maternal and child health services and encourage them to utilize the facilities.

VIII. Nutrition

1. Identify cases of malnutrition among pre-school children one to five years in the intensive area and refer them to Baiwadis/Primary Health Centre for nutrition supplements.
2. *Identify cases of malnutrition among pre-school children (2nd to five years), in the twilight areas and refer them to Baiwadis/Primary Health Centre for nutrition supplements.
3. Distribute iron and folic acid as prescribed to children from one to five years in the intensive area and *(to pregnant and nursing mothers, children from zero to five years, and family planning acceptors in the twilight area).
4. Administer vitamin 'A' solution as prescribed to children from one to five years in both the intensive and the twilight areas.
5. Educate the community about nutritious diet for mothers and children.

IX. Vital Events

1. Enquire about births and deaths occurring in the intensive and twilight areas,

record them in the births and deaths register and report them to the Health Assistant (Male).

2. Educate the community on the importance of registration of births and deaths and the method of registration.

X. Record Keeping

1. Survey all the families in his area and collect general information about each village/locality in his area.
2. Prepare, maintain and utilize family records and village registers.
3. With the assistance of the Health Worker (Female) prepare the Eligible Couple Register from the family records and maintain it up-to-date.
4. Prepare and submit periodical reports in time to the Health Assistant (Male).
5. Prepare and maintain maps and charts for his area and utilize them for planning his work.

XI. Primary Medical Care

1. Provide treatment for minor ailments, provide first aid for accidents and emergencies and refer cases beyond his competence to the Primary Health Centre or nearest hospital.

XII. Team Activities

1. Attend and participate in the staff meetings at Primary Health Centre/Community Development Block or both.
2. Coordinate his activities with the Health Worker (Female) and other health workers, * (including the dais in the twilight area).
3. Meet the Health Assistant (Male) each week and seek his advice and guidance whenever necessary.

JOB RESPONSIBILITIES OF LABORATORY TECHNICIAN

Note: All Primary Health Centres and Subsidiary Health Centres have been provided with a post of Laboratory Technician/Assistant. The Laboratory Technician will be under the direct supervision of the Medical Officer, Primary Health Centre.

The Laboratory Technician will carry out the following functions :

I. General Laboratory Procedures

1. Maintain the cleanliness and safety of the laboratory.
2. Ensure that the glassware and equipment are kept clean.
3. Handle and maintain the microscope.
4. Sterilize the equipment as required.

5. Dispose of specimens and infected material in a safe manner,
6. Maintain the necessary records of investigations done and submit the reports to the M.O. PHC.
7. Prepare monthly reports regarding his work.
8. Indent for supplies for the laboratory through the M.O. PHC and ensure the safe storage of materials received.

II. Laboratory Investigations

1. Carry out examination of urine
 - (i) Specific gravity and PH
 - (ii) Test for glucose
 - (iii) Test for protein (albumen)
 - (iv) Test for bile pigments and bile salts
 - (v) Test for ketone bodies
 - (vi) Microscopic examination.
2. Carry out examination of stools
 - (i) Macroscopic examination
 - (ii) Microscopic examination.
3. Carry out examination of blood
 - (i) Collection of blood specimen by finger prick technique
 - (ii) Haemoglobin estimation
 - (iii) RBC count
 - (iv) WBC count (total and differential)
 - (v) Preparation, staining and examination of thick and thin blood smears for malaria parasites and for microfilariae
 - (vi) Erythrocyte sedimentation rate
 - (vii) VDRL

4. Carry out examination of sputum
 - (i) Preparation, staining and examination of sputum smears for Mycobacterium tuberculosis.
5. Carry out examination of skin and nasal smears
 - (i) Preparation, staining and examination of skin smears for mycobacterium leprae
 - (ii) Preparation, staining and examination of nasal smears for Mycobacterium leprae.
6. Carry out examination of semen
 - (i) Macroscopic examination
 - (ii) Sperm count and motility.
7. Prepare throat swabs
 - (i) Collection of throat swab and examination for diphtheria.
8. Test samples of drinking water
 - (i) Testing of sample for gross impurities.

III. Maintenance of Records and Registers Under NMEP

1. He will maintain all records of slides examined by him and must get the positive slides confirmed by the Medical Officer of PHC.
2. Daily progress and output register of blood slide examination.
3. The back-log chart of pending radical treatment vis-a-vis collected slides.